

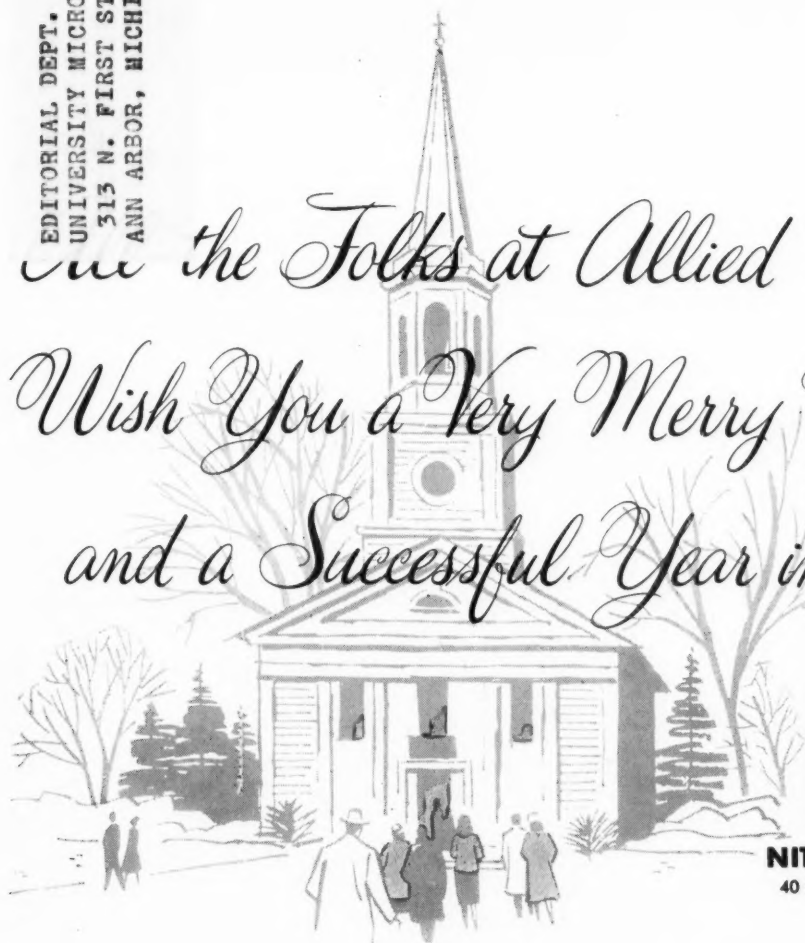
December  
1961

# COMMERCIAL FERTILIZER

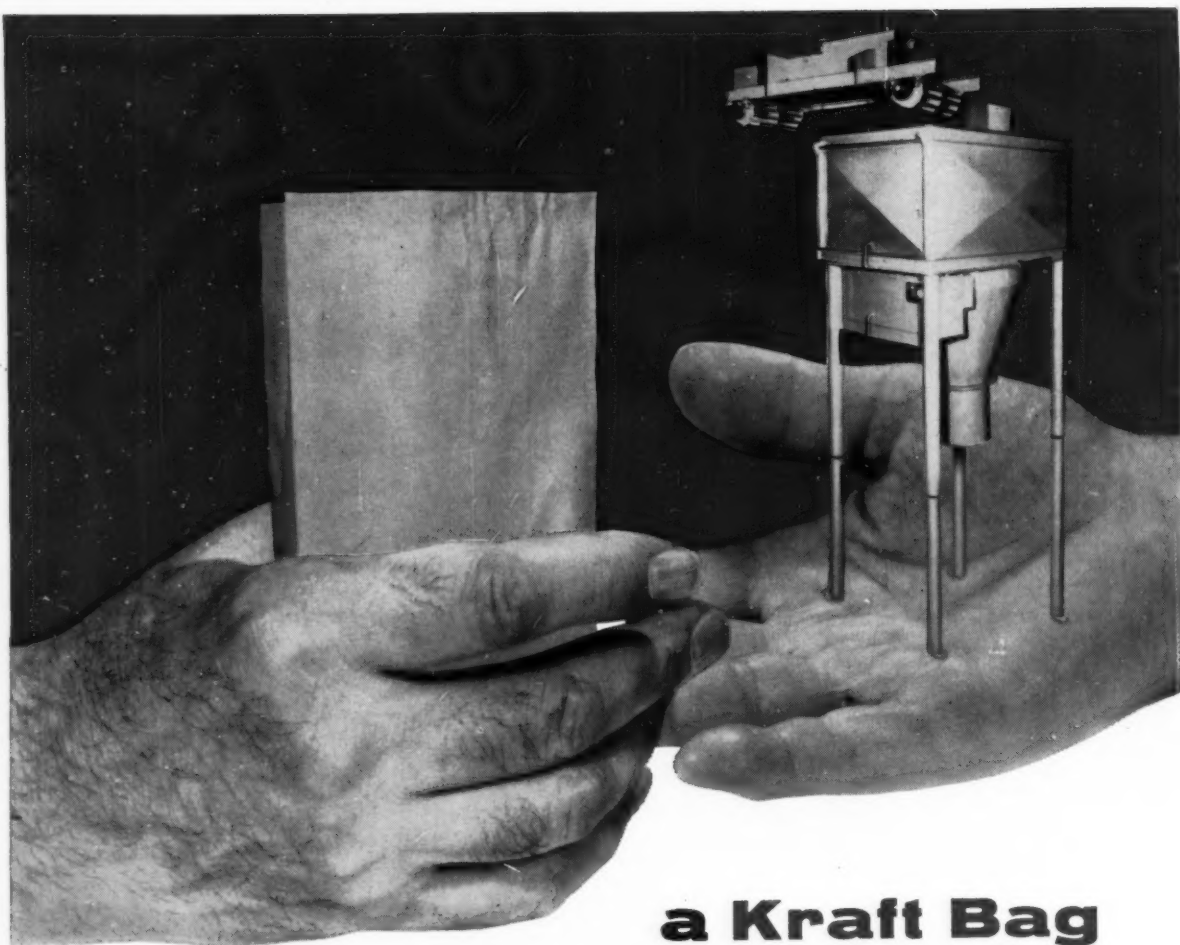
and PLANT FOOD INDUSTRY

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October 1, 1961

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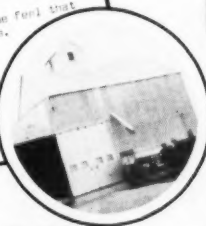
Being able to mix to order according to our customers needs, in my opinion, has proven to be one of the most important features of the Blend-O-Mixer.

We have had numerous visitors during the past year who have stopped in for the express purpose of learning how we liked the plant, how well it works, cost of operation, price of raw materials, profits and many other things. I am glad to report that we have been able to give a positive answer to these questions.

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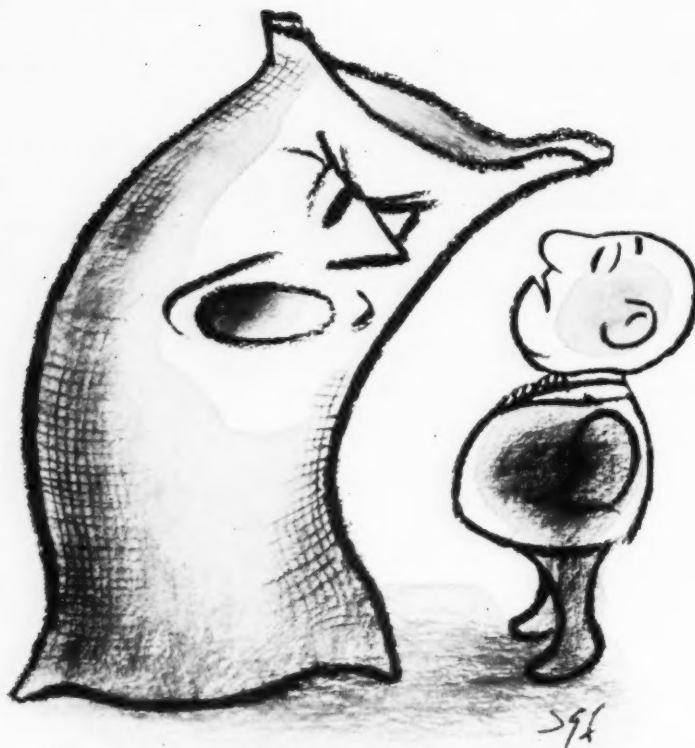
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## ◆ COMMENTING FREELY

by  
**Bruce Moran**

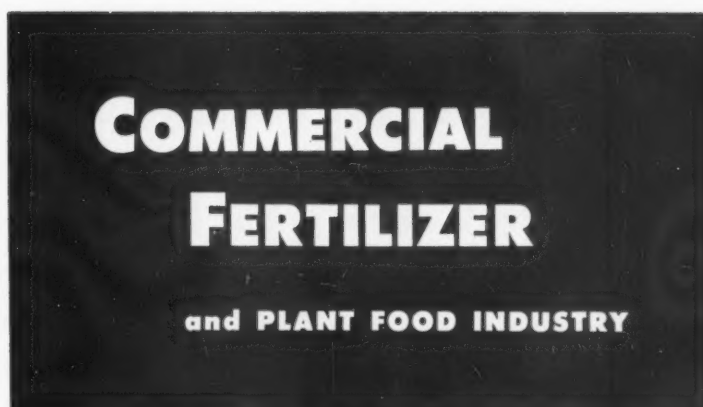
Our industry, like most industries, has its moments of heated word exchanges, of knifing, of price-cutting and under-the-table discounting. But it is not only the fertilizer manufacturer who is guilty of these things. Sometimes the suppliers get into the act.

We hear tales of bitter back-biting on the supply side of the fence just now. And we suppose it is the normal result of a feeling that some of our raw materials are about to be in overlong supply.

There may be short-range justification for some of this feeling. But the longer-range picture cannot justify activity which may hurt an industry whose future is perfectly clear to anyone who takes the trouble to study the picture ahead.

Anyhow, back-biting never helped either the biter, the bitee or the industry involved. Let's all shake hands and be friendly competitors. We have a big common stake in the period just ahead.

December, 1961



Vol. 103, No. 6

December, 1961

Established 1910

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## Again...

### New Solar nitrogen plant at Joplin, Missouri, dedicated to serving your nitrogen needs still better

The new Solar nitrogen plant at Joplin, Missouri, now extends Sohio service throughout the central part of the United States. The plant, constructed by Solar Nitrogen Chemicals, Inc., enables Sohio (acting as sales agent for Solar) to better serve the nitrogen needs of the fertilizer industry. It substantially increases availability of Solar nitrogen materials during peak seasons.

If you're a regular customer, you know that continuous improvements in service, delivery and product are SOP of the Solar-Sohio team. This leadership has contributed many "firsts" in the fertilizer industry during the past few years. In addition to the new Joplin plant, they have pioneered these improvements in service:

- First to give truck delivery of solutions and anhydrous.
- First to give bulk truck delivery of urea.
- A leader in the use of pressure, aluminum tank cars for nitrogen solutions.
- First to build large bulk storage to meet on-season demand of the industry.
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Photographed July 29  
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- Pioneered research in liquid fertilizer solubility.
- Devised practical but accurate shortcuts for methods of liquid formulation . . . i.e., triangulation formulation, formulation pads.
- Led in researching nitrogen solutions solubility and vapor pressure.
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First is a genuine feeling of responsibility to serve your nitrogen needs as completely and as efficiently as we know how. Second is a thorough knowledge of agriculture . . . a real insight into your fertilizer formulation needs.

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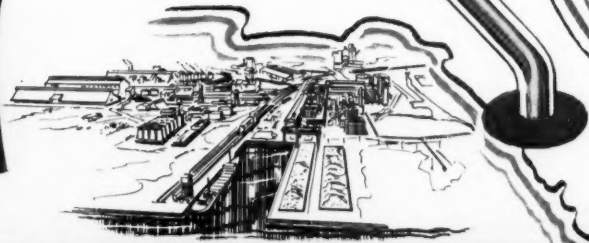
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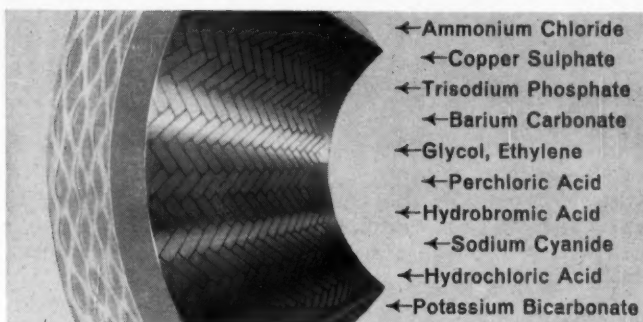
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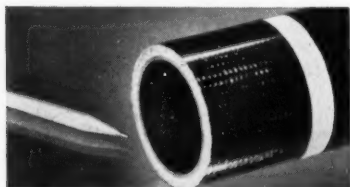


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You see above the dramatic ability of Fibercast pipe to "live with" punishing chemicals without ill effects—without trace of corrosion or scale.



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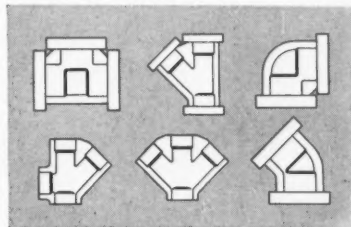
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## JUST AROUND THE CORNER

By Vernon Mount



THE PASSING of Mr. Sam marks the end of another era in American politics as — so many years ago — did the passing of Uncle Joe Cannon. Our history contains only a few such periods of back-stage, one man rule. Only at long intervals do we find an assuming leader, who really leads, who stills the cloakroom squabbles, who gets done the things his nation needs done.

A FARM BOY in the log cabin tradition, Mr. Sam remembered the farmer, the poor sharecropper. But they were integrated in his mind with the needs of the urban American.

A FIGHTER and a diplomat, he will be remembered by millions as the man who ruthlessly dropped the gavel on any possible Nays at national conventions.

THE MAN BEHIND the man behind the big desk, he will be missed sorely, come January, by the President whose bacon he saved in the first six months of the New Frontier.

Yours faithfully,

*Vernon Mount*

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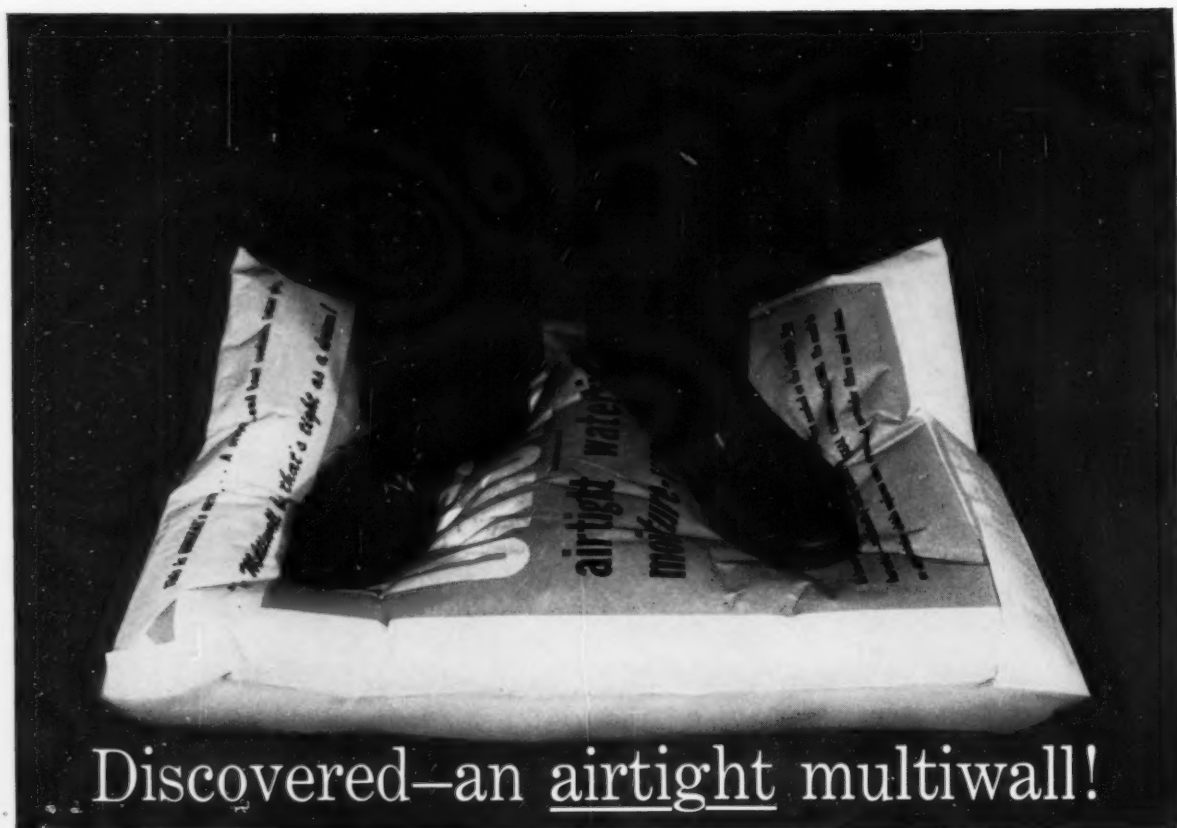
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## Discovered—an airtight multiwall!

### Simple demonstration helps solve major packaging problem for Dow Chemical

The multiwall bag you see here contains nothing but air. The man standing on it weighs 200 lbs. Yet no air can escape. *That's because the bag is Union-Camp's amazing new UNISEAL.*

It ended a two-year search by Dow Chemical for a package that would provide a perfect vapor barrier.

#### Protection problem critical

The search began when Dow first developed an effective new crab grass killer. To successfully market this new product, an unusually tight package—even air-tight—was essential. The ideal package also had to be sturdy, printable, easy to handle and ship. And economical.

One day Dow engineers witnessed the UNISEAL demonstration you see above. If the bag could lock in air, then it must have the perfect vapor barrier. Further testing proved they were right.

#### Seals safely—and saves, too

The remarkable new UNISEAL bag features four plies. An outer sheet of semi-bleached paper (for top print-

ability). Two middle plies of kraft. And an inner ply of kraft laminated to aluminum foil with polyethylene. A final extrusion coating of polyethylene resin over the foil serves as the heat-sealing medium for the inner seam and bottom.

The bag can easily be filled on any standard filling equipment. A special machine heat-seals the inner ply and applies adhesive to the tops of the outer plies. It then folds over the lip and pastes it to the outside of the bag. Finally, the machine centers a

strip of gum tape over the edge of the lip to form a positive *air-tight* closure.

Apart from providing a perfect vapor barrier, Union-Camp's UNISEAL bag also turned out to be the least expensive container of any previously tried!

#### How much could a Union-Camp multiwall idea save you?

Hundreds of companies, large and small, have cut costs through Union-Camp multiwall ideas like this. Our comprehensive packaging service—5-Star Plan—covers bag construction, design, specifications control, packaging machinery and a survey of your plant. And it's free.

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**UNISEAL'S unique inner ply** is made of kraft paper laminated with polyethylene to aluminum foil. Bags can be easily filled on any standard filling equipment.

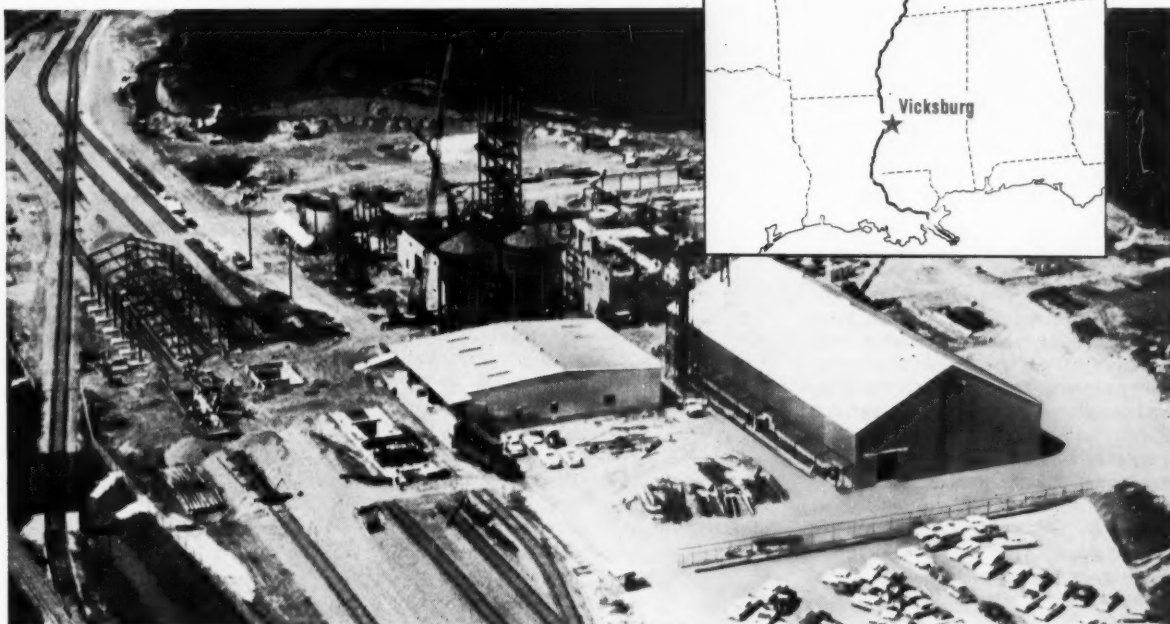


**Secret of sealing.** Special machine heat-seals inner ply, folds lip over and pastes to outside of bag. Finally, gum tape is applied (arrow) forming a positive air-tight closure.

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MULTI WALL BAGS  
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# The Home Market for Fertilizers

## and the developing role of self-service in that market

by GEORGE DOHERTY

### I. INTRODUCTION

I want to talk about the potential of the urban fertilizer market as well as the changing, competing channels of non-farm fertilizer distribution.

It is not clear, much less certain, that most fertilizer for the home market will be sold through grocery stores — or super markets as they are commonly called today. Other self-service retailers, such as discount houses, chain drug stores, junior department stores, and variety stores, are, more and more, establishing self-service outlets at convenient locations in suburbia. Unfortunately from our standpoint, the super market no longer has a monopoly on self-service, convenience shopping, and what we food retailers accomplish in fertilizer will depend on the effectiveness of our distribution and merchandising of this product in competition with these other channels of distribution.

In the super market field, the fertilizer market has been neglected until now. We do not, however, intend to continue neglecting it, and I think you may be interested in our changing point of view.

### II. THE STATISTICS OF THE MARKET — ITS POTENTIAL BASED ON THE BEST INFORMATION AVAILABLE

Let's begin by taking a research, or quasi-research, look at the home fertilizer market. We will examine its size, its pricing, its packaging, to some extent the assortment of different kinds of fertilizer being offered, its growth and its potential.

The very first thing that impresses is that your industry must have had, in the past, a singular lack of interest in marketing your products to the home consumer; otherwise, there would be far more information available. Raoul Allstetter tells me that this has already changed, not with respect to there being more adequate information as yet, but with respect to a real concern to obtain information as a genuine inter-

est on the part of many fertilizer producers (other than two well known producers, of course, who have been interested in this part of the market for a long time) — a genuine interest in exploiting the home market. I would say that it is about time for this interest to develop.

The persons I have talked to seem to agree on the fact, or the approximate fact, that the lawn and garden market already amounts to 10% or more of your industry total volume. I think there is also agreement that this 10% is growing much more rapidly than the farm market for fertilizer.

Unfortunately, the lack of statistical information about the market handicaps me in this discussion, or, at any rate, it forces me to go out into the wild blue yonder and deal with uncertain information, and I am sure you will all keep this in mind.

I am informed by your Association that the best estimate of the lawn and garden market for fertilizer *totally*, including, in addition to homes, such other non-agricultural users as golf courses, parks, institutions, nurseries, etc., is \$200,000,000 per year, based on 5¢ per pound of finished product. In our area, this 5¢ per pound appears to be on the low side, considering that no inorganic home fertilizer to my knowledge retails at less than 6¢ per pound, and that a leading brand currently retails at 22½¢ a pound. Another leading brand sells regularly at 11¢ per pound. I would guess that the average retail price for lawn and garden fertilizer sold

to the home is about 7½¢ a pound. But first, let's convert the \$200,000,000 into a figure which represents the home lawn and garden market because this is the only market on which I am at all qualified, and have been invited, to speak.

The one man who has done market research in this area, as I understand it, is Arnon Mehring, with whose articles I am sure all of you must be familiar. Mr. Mehring says that one-half of the total lawn and garden market is constituted by home use. If we accept this as an assumption, \$100,000,000 represents the home market at 5¢ per pound. Then, if we raise 5¢ a pound to 7½¢ a pound as a more realistic average retail price, we obviously raise the estimated retail sales volume for the home market from \$100,000,000 per year to \$150,000,000.

Now the next question in our crude market analysis is, "How is this \$150,000,000 distributed?" — and, again, this is the best figure available to me and obviously we cannot be certain of it — "Through what channels is it distributed? And at what distribution costs, gross profit, and retail prices?" There are no answers to these questions, statistically speaking, I think we know, however — based on figures from our own stores — that the food store part of this total is very small — probably not more than 10% or \$15,000,000 per year. I seriously doubt that other self-service outlets right now account totally for as much as another \$15,000,000 per year. This would indicate a total through self-service outlets of \$30,000,000 a year at the most, and would mean that \$120,000,000 of fertilizer at retail prices is annually being sold to the home market through non-self-service outlets, such as feed stores, lawn and garden stores, hardware stores, etc.

I understand that Mr. Mehring is of the opinion, based on his numerous interviews with customers all over the country, that fertilizer bought for homes is used about 50% for fertilizing trees, shrubs, and gar-

### THE AUTHOR

Mr. Doherty is vice president for merchandising and operations of Topco Associates, Inc., a management company and subsidiary of 25 supermarket chains with aggregate annual sales of \$1,750,000,000 — reportedly the fourth largest volume in the retail food industry. This paper was presented October 12 to the Northeastern Fertilizer Conference sponsored by National Plant Food Institute.



den vegetables and flowers and the other 50% for lawns. I think it is also his opinion that 50% of non-farm families use some fertilizers, and the other 50% use none. He pegs the annual usage by the 50% of the families who do use fertilizer at somewhere between 80 and 100 pounds per year per family.

Now let's check Mr. Mehring's figures against our estimate, derived from your Association's figures, of \$150,000,000 as the present size of the home market. Ninety pounds per year times 7½¢ at retail is equal to \$6.75 per family per year. There are 42 million non-farm families in the United States, and Mr. Mehring thinks that 50% of these use fertilizer, which means 21,000,000 families. Twenty-one million families times \$6.75 per family per year is equal to \$142,000,000. So Mr. Mehring's analysis appears to check quite closely with our other annual estimate of \$150,000,000 — more closely than one would have a right to expect in the circumstances.

What about the growth of the market? Obviously, a big potential for growth in the home market lies in the increase of the number of families using fertilizer. No doubt some of the non-users are apartment dwellers, but unfortunately the Census Bureau has no figures available for the number of apartment houses, or houses without lawns. Let's roughly estimate 5,000,000 such families. Deducting this estimate from the 21,000,000 non-farm families presently not using fertilizer leaves 16,000,000 families with lawns who are not using fertilizer for such reasons as low incomes or perhaps not having been sold and educated in the use of fertilizer. It seems to me quite safe to say that many of these 16,000,000 families will become users of fertilizer in the decade of the Sixties.

I doubt that anyone in this audience would question that every year there are more families in the category of users of fertilizer for home purposes, and that the number of such additional families exceeds the growth in population. In other words, a substantial number of families are converted to the use of fertilizer.

Now I will make a guess that somewhere between 1965 and 1970, the number of families using fertilizer will increase by at least 50% so that there will be more than 32,000,000 such families. In part, this will reflect the growth of the population and resulting growth in the number of homes; in part it will reflect the conversion of present

non-users.

Now let's look at the possible expansion in the average annual usage by using families, which Mr. Mehring now thinks is between 80 and 100 pounds and which, in our estimate, we put at 90 pounds, midway between his two figures.

If, on the average, half of this ninety pounds is devoted to fertilizing the lawn, this indicates one or one and a half applications per year of a typical fertilizer, depending, of course, on the size of the lawn. I do not think there are any figures available on the average size of lawns, but, like everything else in the American standard of living, this is growing. Now unquestionably there will be merchandising and advertising pressure on the consumer to increase the number of applications per year. And as one user of fertilizer, I think that if you want a flourishing green lawn in a Chicago suburb which has trees and considerable shade, several applications per year are desirable — perhaps as much as one application per month during the growing season.

So, as a wild guess, how much can the market expect to expand during this decade from increased application of fertilizer by using families? Let's just roughly say another 50%. This would mean, totally, a doubling of the market between now and 1970 — 50% from new families at the present average rate of use per family, and 50% from increased usage by present families. Of course, this is a very sloppy statistical analysis, and I am sure you followed that I am roughly assuming that the new families will use about the average amount now used by present using families — that is, 90 pounds per year. I am not assuming that the new families will consume an average of 135 pounds per year, the level to which, we are guessing, present using families will raise their purchases. I am sure you also followed me in the assumption that usage by present using families of fertilizer for trees, shrubs, and gardens would also go up by 50%, and not just the lawn usage. These assumptions are entirely arbitrary, but seem to me to have a ground in common sense.

So that, without any adjustment for possibly rising prices, we guess this home fertilizer market at retail prices to be a \$300,000,000 market by or before 1970.

### III. CHANNELS OF DISTRIBUTION; SELF-SERVICE RETAILING OF FERTILIZER

Now let's look at the distribution of the product. In the title of my

talk, I refer to this as, "The Developing Role of Self-Service Merchandising of Lawn and Garden Fertilizer for Home Use." This obviously implies that I think more fertilizer for home use will be sold through self-service outlets. I have an apparent bias in this respect because of my background. Nevertheless, I think that there are compelling reasons for expecting this to occur.

Let's look at the reasons that have caused self-service merchandising to become increasingly important in nearly all consumer products that do not require important continuing service to the customer by the retailer; or that do not involve style, which mainly concerns women and apparel for women; or, finally, that do not involve a very high price ticket. Generally speaking, if you put these three categories aside, it is true in American retailing that virtually all other products are being converted to self-service merchandising. This is occurring because such merchandising and distribution is cheaper, and because self-service outlets are constantly looking for products which they can distribute and retail in self-service at lower distribution costs and lower retail prices. The economics of this process work simply, according to the following equation:

Self-service plus convenient location plus high traffic = low average operating cost = low selling prices = still greater volume.

This equation has produced a gross profit of about 20% in food stores — super markets — and an operating expense ratio of about 17½%. And discount houses appear to have a still lower cost of distribution reflected in a gross profit which may be as low as 15% for the categories of products normally sold through food stores. *Whenever a product is being sold mainly through other outlets at higher gross profit (and cost of distribution) — say, 30% to 50% — the super market and the discount house are powerfully motivated and able to sell the product at a gross profit between their own average gross profit of 15% or 20% and the higher 30% to 50% gross profit of the less efficient outlets.* And this inevitably, and usually over a relatively short period, diverts a major share of the business for the product to the lower-cost self-service form of retailing.

You all know how this has happened in the staple drug and cosmetic products, excluding, of course, prescription products. More than 50% of tooth paste, hair spray, aspirin, and such products are sold now

through food stores, and a significant additional percentage is sold through self-service drug stores and variety stores. For the most part, this shift has occurred in the last ten years.

What brought it about? The 20% overall gross profit of super markets has acted as a powerful magnet to pull the business into these outlets from the old-fashioned drug stores that sold at approximately a 50% gross profit. And, of course, the food stores, or super markets, did not at the outset bring, and have not yet brought, the gross profit of packaged drug items down to their average, overall 20% gross. Instead, they took the market initially on the basis of a gross closer to 40%, but you can be sure they will not hold it on that basis. Discounting of these products is now occurring in more and more areas, and unquestionably the gross of these products will settle down to a level not far above 20%.

Essentially, the same thing happened during the last 10 or 15 years in candy merchandising. So far as popular-priced candy is concerned, much of this volume went through variety stores, and much of it still does, but 15 years ago the variety store gross profit on candy was approximately 40%. The super market saw a great opportunity in merchandising candy at a 30% gross, so super markets, on a self-service basis, are now a very important factor in candy merchandising, and I think the gross of variety stores, most of which are now self-service, probably has settled down to 30% or close to it.

The same trends to self-service merchandising, accompanied by lower costs of distribution and lower gross profits, have occurred at very fast rates in soft goods other than dresses and suits. This soft goods trend started several years ago with the growth of discount houses. Dry dog food was formerly sold by feed stores, and it still is, but decreasingly so. There have been similar trends in many kinds of housewares, such as glassware, plastic containers, lawn furniture, etc.

I think you can expect that if self-service outlets account for 20% of home fertilizer distribution today (and that, of course, as I said before, is a guess), this percentage will increase to well over 50% by the end of this decade. It will grow because gross profit will be cut and retail prices will be cut, and because powerful merchandising factors, possibly under national brands, possibly under private brands (that

is retailer-owned brands), will do what is necessary to package, display and promote these products under self-service conditions.

I am sure I do not have to point out that packaging and display are absolutely vital in any kind of self-service merchandising. Super market operators have a very poor share of the fertilizer market because they have not, to a surprising degree, been as conscious of fertilizer as they have of garden hose or charcoal or some other outdoor home products. And this has led nearly all of them to neglect fertilizer in their advertising and in their seasonal spring promotions and has resulted in very poor store displays of fertilizer, even at the peak of the spring buying season.

Fertilizer will not sell in volume in food stores unless it is presented to the customer in an attractive setting. It can not just be put in small quantities on a shelf next to, for example, powdered detergent or dry dog food.

Is there an opportunity for greatly increased self-service merchandising of fertilizer at a lower cost of distribution and at lower retail prices? I think the answer to this is obviously "yes".

Let's take what I understand is a leading brand of home fertilizer today, which retails at \$4.95 and costs the retailer \$2.72, producing a gross profit of 45%. This is a very attractive gross profit, and the powerful magnet about which I was speaking earlier will unquestionably go to work in this case as soon as self-service retailers become conscious of the fertilizer market and exploit it rightly in packaging, display, promotion, advertising, etc. Self-service retailing will undercut this 45%, and I think the eventual result will be a gross profit which may even come down to the average gross profit of super markets — and remember, there are some self-service outlets, such as discount stores, that operate at an even lower average gross profit than 20%. But in any case, the average gross profit for fertilizer might well eventually decline as low as the average gross profit of all products sold through super markets — 20%. What I am trying to say is that there isn't any necessary or inevitable reason why the gross profit should stay higher than this. There are no exceptional costs involved in buying, stocking, and distributing fertilizer.

Now it might be argued that the present, non-self-service outlets, which today, if I am correct, sell 80% of the market at a high gross

profit, will continue to do so because of the customer's need for expert advice in what type of fertilizer to buy, how to apply it, etc. There is doubtless a need for such advice, but if my experience is valid, the typical dealer doesn't supply it. The customer has to learn in other ways. There is also the question of assortment. There are, of course, many formulas, but I suspect that self-service outlets will do very well with two — one higher in price, one lower. Consider the success of the two leading brands at present. I'm speaking, of course, of lawn, garden and tree fertilizer.

Will the super markets seize their opportunity in the home fertilizer market, as they have in staple drugs, beauty aids, candy, and other products?

Super markets today (and, if you have not already heard it, there are 33,000 of them in this country and they do 70% of all food business for home consumption) have done a very poor job of merchandising fertilizer. I think they have not, in the past, been any more conscious of its potential than your industry has been conscious of its potential.

To show this, let me quote some information from our super markets, which number about 800. These super markets are roughly twice the size of the average super market in the industry. This means that our stores are big stores and have more room for non-food items and for the display and merchandising of non-food items and, therefore, can do this more aggressively than smaller super markets, such as those operated by the big national chains. Nevertheless, one of our chains, which is outstanding in non-food retailing generally, reports that this spring they sold only 2,000 bags of fertilizer *totally* in about 50 stores which do an average per store of \$3,000,000 — three times the average for super markets generally. Another chain of only half that size sold 6,400 bags, or a little over three times the number of bags sold by the larger chain.

Recently, in surveying the fertilizer sales by our chains, we found that they were in many cases, such as these just mentioned, pitifully small. We also found a very bright ray of hope on which we will probably base our program, and that is that one chain has ten garden centers, which averaged a thousand bags of fifty-pound fertilizer *per center*. This is 500,000 pounds sold through ten stores. If we sold at this rate through our 800 stores, our

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# Arcadian® News

Volume 6

Nitrogen Division, Allied Chemical Corporation

Number 12

## More and More Farmers are Finding It Pays to Use "ENUF" Fertilizer!

### REPORTS INDICATE INCREASING KNOWLEDGE OF VALUE OF FERTILIZER

**Reports** from many sections of the country reveal a widespread and rapidly growing interest on the part of farmers in the proper use of fertilizers to increase farm efficiency. Farmers are testing their soils, studying official recommendations and conducting their own side-by-side field tests to determine the amounts and analyses of fertilizers that will produce the greatest returns from their crops on their particular soils. They want the best yields they can get from every planted acre.

#### New Goals in Indiana

Improved fertilizer programs are keeping crop output at record levels in Indiana. Many corn farmers are increasing plant population per acre to obtain better utilization of higher rates of fertilization. As one corn-hog producer says: "More plants using more fertilizer make me more money." Corn populations on many farms range from 17,000 to 22,000 plants per acre...and up. One farmer, who boosted plant population and fertilizer application, says: "Last year, I averaged 70 bushels of corn per acre; this year I am over 125 bushels per acre—and this is supposed to be poor corn land."

Typical applications of starter fertilizers by good farmers in Indiana are 200 pounds or more per acre, with the analysis depending on the needs of the



Dug from a central Kansas field on October 25, the dryland wheat at left shows the effect of starter fertilizer. It is from land continuously cropped. The wheat at right, without starter fertilizer, is from land fallowed last summer.

crop and soil. Nitrogen—used as plow-down or side-dressing—runs from 100 to 150 pounds of actual N per acre. For continuous corn, higher rates are being widely adopted to assure high-profit yields.

Farmers are setting goals for their fields, testing their soils, and then "putting in the extra fertilizer needed to get the yields to meet the goals." Side-by-side tests on the farm have proved convincing. "There is always someone looking over our test plots," says one farmer. His dealer says farm test plots help him to sell more fertilizer.

Livestock producers are increasingly aware of protein content and feeding value of grains. A leading Illinois hog raiser points out: "We are fertilizing to get nutritional value as well as yield."

#### Illinois Prescription Farming

On the fat, flat lands of Illinois, continuous cash corn is getting heavy applications of fertilizer, and is proving that it can produce high cash income plus improved soil tilth and fertility. Where sod is plowed down, two or three years of corn in a rotation is making more

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profit where plenty of fertilizer is used. Regular soil tests are typical with good farmers.

Plow-down of mixed fertilizer and nitrogen and side-dressing with nitrogen are common practice. Starter fertilizers are trending to high-phosphate mixtures.

Prescription fertilizing and other programs designed to use the full capacity of native soil productivity and moisture supply are taking hold. Five-acre corn contests are stimulating interest in fertilizer. Also, many farmers are testing increased applications of fertilizer on small acreages to find out whether it pays to use more fertilizer.

The urge to use more fertilizer per acre is being felt by stockmen who want all the corn they can grow and by cash croppers who take better care of their acres that are not idled by the feed-grain program. This year, Illinois again led all other states with an average of 76 bushels of corn per acre.

### **Test Plots in Iowa**

In eastern Iowa, many farmers are conducting their own field tests to compare the effects of different fertilizer treatments. Results, as checked by farmers, dealers and college officials, show big yields and profits from fertilizer programs which include up to 100 pounds of nitrogen, 60 pounds of phosphate and smaller amounts of potash. On good soils in the area, the right mixture of starter fertilizer plus nitrogen side-dressing is the typical program for profit.

One farmer, who runs test plots regularly on his own land, has taken to conducting similar tests on rented land in cooperation with his dealer. This practice convinces the land-owner and other farmers that more fertilizer pays.

Another corn grower, who gets yields as high as 125 bushels per acre, says: "Land, taxes, labor and machinery cost us just about the same, whether we harvest 10 bushels or 100 bushels per acre. We cannot afford not to use fertilizer—the only question is how much will pay the best profit."

### **Complete Fertilizer Pays**

Many soil tests in eastern Kansas and Nebraska continue to indicate no real need for potash. However, corn and wheat growers who conduct fertilizer tests in their own fields are finding that it pays to use complete fertilizer containing potash. With potash, the corn is heavier, less chaffy and less susceptible to stalk rot. Wheat straw stands up

better and test weights of grain run four to six pounds heavier.

In Nebraska, grain sorghum has been popular on dry land, but severe damage by western corn rootworm to irrigated corn will bring heavier planting of milo on irrigated land. Starter fertilizer, plus nitrogen side-dressing, is becoming more important in sorghum production... helping to produce 60 to 100 bushels per acre where average yields are 40 to 45 bushels per acre.

### **Fertilizing Kansas Wheat**

For many years, very little fertilizer was used on wheat in Kansas. Now, farmers are beginning to use mixed fertilizer at planting time and nitrogen top-dressing later. In side-by-side field tests this fall, grain made twice as much top and root growth with 100 to 150 pounds of fertilizer per acre as it made without fertilizer. In many farming areas, 100 to 150 pounds of fertilizer per acre seems small. But, where fertilizer is just beginning to take hold, this application of fertilizer represents real progress.

### **Southeast Keeps Learning**

The Southeastern states have been heavy users of fertilizer for many years, but farmers keep learning more about fertilizer and keep using it better to produce more profitable yields. This is particularly true in the case of cotton and tobacco. Soil types, climate, heavy rainfall and continuous cropping—all increase the need for plant food.

In a North Carolina cotton county, where a yield of three-fourths of a bale per acre is common, leading farmers are using enough fertilizer to produce 1½ bales per acre. One grower of several hundred acres of cotton uses 700 pounds of fertilizer per acre plus nitrogen side-dressing. His best field produced 27½ bales on 18 acres.

### **Good Farmers Stay Ahead**

State average yields in the Southeast continue to rise, with leading farmers staying well ahead of these averages. In South Carolina, the 10-year average yield is 22 bushels of corn per acre. In 1961, this average increased to 34 bushels per acre. Yet, a leading Piedmont area farmer produced 125 bushels per acre by using 600 pounds of fertilizer plus 50 pounds of nitrogen side-dressing per acre.

On Virginia land, which has been farmed since the days of George Washington, the use of fertilizer is on the upswing. One grower, who uses his farm

income to build up his farm, has increased his corn yield from 62 bushels per acre to 87 bushels per acre in a below-normal rainfall period. He plows down 200 pounds of fertilizer per acre, uses 300 pounds of fertilizer in the planter, and side-dresses with nitrogen. Much of his corn also gets cattle manure. He says: "We are just going to have to use more fertilizer per acre, because it pays. I want to expand my herd, not my acreage."

### **Fertilizing Coastal Bermuda**

In the Southeast, cash crop farmers and livestock farmers are building profits by improving their use of fertilizers. For example, a South Carolina dairyman uses enough fertilizer to get high production of all the feed he grows—hay, silage, pasture, green chop and grain. As a result, his feed cost per 100 pounds of milk is about \$1.90.

He uses 600 pounds of fertilizer per acre on corn, followed by nitrogen side-dressing. He uses 500 pounds of fertilizer per acre on small grains, plus nitrogen side-dressing.

He starts his Kentucky fescue grass with lime and 500 pounds of fertilizer per acre and top-dresses with nitrogen twice a year. His prize crop of Coastal Bermuda grass gets lime and 800 pounds of fertilizer per acre plus three nitrogen top-dressings per year. His 25 acres of Coastal Bermuda carried 75 head of young stock through the season and still had to be clipped for hay. Thanks to fertilizer and good management, he gets 330 days of grazing per year.

### **The Goal of the Industry**

Wherever you go throughout the country, you will find more and more farmers learning more about fertilizer and making better use of fertilizer on their own farms. Often these farmers move far ahead of average fertilizer use and even exceed official recommendations and prove that it pays. They use enough of the right ratios of plant foods to produce extra yields and extra profits. Statistical experts have pointed out that 20% of the farmers produce most of the farm products and use most of the fertilizer. The goal of the fertilizer industry should be to increase the percentage of the efficient farmers who use enough fertilizer and use it properly. This is the road to success for everyone concerned.

NOTE: The information furnished in this issue of the ARCADIAN News is obtained from studies and tests considered reliable; results, however, are not guaranteed.





## YOUR ATTITUDE IS CONTAGIOUS

**Last spring**, a fertilizer salesman called on two dealers in the same town. Same opportunities! Same problems! Same weather! Same crops! Same soils! But what a difference in sales!

One dealer wasn't moving much fertilizer. He runs an ad in the local newspaper once in a while but thinks it probably doesn't pay. He stands behind his counter and waits for customers to come in. He complains that business is "bad".

The other dealer was selling a carload of fertilizer every day. He had been out selling almost every day all winter and early spring and had lined up a lot of business. He wasn't concerned with reduced acreages due to the feed-grain program; he had sold his customers a program of using enough fertilizer on the acres they farmed. Competition didn't bother him too much, either. He was too busy selling his products.

A positive, forceful, hard-hitting attitude creates an atmosphere in which sales can be made.

You can develop this positive attitude in your dealers by convincing them that your brand of mixed fertilizer is, by far, the greatest producer of new wealth ever made available to them, their customers, and the whole community. Then, you can keep up their enthusiasm by helping them to *really* sell:

1. *Leave a sales idea on every call.*
2. *Give praise freely where justified. (Every dealer has good points, look for them.)*
3. *Provide him with sales materials and show him how to use them to make sales.*

Your ATTITUDE is contagious. Your customer will catch something from you. What will it be—ENTHUSIASM!!! or GLOOM???

## We Invite Your Suggestions

We constantly strive to make the ARCADIAN News interesting and helpful to our readers. The topics we choose for discussion in our columns are based on questions asked Technical Service Representatives of Nitrogen Division, Allied Chemical Corporation, by manufacturers of mixed fertilizers and their employees. If you have questions you would like to have answered in the ARCADIAN News, we will greatly appreciate receiving your suggestions. Our chief areas of interest having to do with mixed fer-

tilizers are: formulation, ammoniation, production, equipment, agronomy, etc. We do not promise to carry an article on every suggestion we receive, but, if there is sufficient interest in any subject as indicated by your letters we will attempt to obtain the latest authentic data and information on the subject and use this as a basis for an article in our columns. We look forward to hearing from you. Just write to ARCADIAN News, Nitrogen Division, Allied Chemical Corporation, 40 Rector Street, New York 6, N. Y.

## PRECAUTIONS for HANDLING HEAT

When any nitrogen solution has been used in any equipment, it is potentially dangerous to apply artificial heat to that equipment without observing certain precautions. All persons who use heat and all who may become innocent victims of someone else's mistakes should know these precautions so well that they always make sure that they are conscientiously observed.

There have been cases where nitrogen salts have exploded violently in uncleaned equipment when heat was used in repairing, scrapping, or reclaiming scraps...or in attempting to free equipment of blockages. The use of acetylene torches inside equipment can be dangerous. Hydrogen generated by acids can also be a hazard.

To avoid the dangers of applying artificial heat, all deposits and scales of nitrogen salts must be removed from equipment where any heat above that of low-pressure steam is to be used. Removing deposits from large tanks requires much water with force and often shovelling and wire brushing. Inspection is easier after thorough cleaning. All pockets, such as nozzles, sumps, lapped seams and rivets demand special attention to get rid of salt deposits.

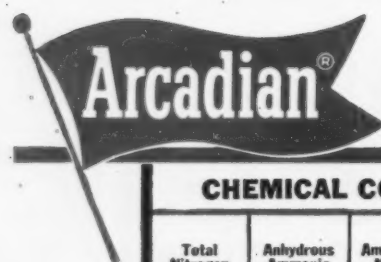
When small tanks are to be repaired, they should be cleaned and then positioned so that the repair point is on top. The tank should be filled with water to near the leak before starting repairs.

When hot water or steam is to be applied to free blockages, dangerous pressure may develop unless provision is made for releasing this pressure.

The use of properly-designed, corrosion-resistant equipment will greatly reduce the need for repairs or scrapping. Choice of the correct nitrogen solution, good operating techniques and insulation of pipelines will all help to minimize the salting out which causes deposits of salt in the equipment.

For further information on the proper handling of nitrogen solutions in your plant, contact Technical Service, Nitrogen Division, Allied Chemical Corporation, 40 Rector Street, New York 6, N. Y.

# The best N for your N-P-K



## NITROGEN SOLUTIONS

	CHEMICAL COMPOSITION %							PHYSICAL PROPERTIES		
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Nitrate N of Total N (%)	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®										
2	41.0	22.2	65.0	—	12.8	27.7	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	27.8	10.8	1.147	18	15
3	41.0	26.3	55.5	—	18.2	23.6	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	23.9	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	24.0	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	31.5	8.9	1.184	1	56
4M	41.0	19.0	72.5	—	8.5	30.9	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	21.4	13.9	1.050	48	-52
7	45.0	25.3	69.2	—	5.5	26.7	11.2	1.134	22	1
URANA®										
6C	43.0	20.0	68.0	6.0	6.0	27.7	9.3	1.180	12	39
6M	44.0	22.0	66.0	6.0	6.0	26.3	10.0	1.158	17	14
10	44.4	24.5	56.0	10.0	9.5	22.1	11.0	1.114	22	-15
11	41.0	19.0	58.0	11.0	12.0	24.7	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	19.7	11.7	1.087	25	-7
13	49.0	33.0	45.1	13.0	8.9	16.1	13.5	1.033	51	-17
DURANA® (contains 8% formaldehyde)										
20	37.0	13.3	53.4	15.9	9.4	25.3	7.2	1.235	0	36
U-A-S®										
A	45.4	36.8	—	32.5	30.7	—	16.2	0.932	57	16
B	45.3	30.6	—	43.1	26.3	—	13.5	0.978	48	46
ANHYDROUS AMMONIA	82.2	99.9	—	—	—	—	24.3	0.618	211	-108

Other ARCADIAN® Products:  
**URAN®** and **FERAN®** Solutions  
 Ammonia Liquor • **N-dure®**  
**A-N-L®** • Ammonium Nitrate  
**UREA 45** • Nitrate of Soda  
 Sulphate of Ammonia

### NITROGEN DIVISION

MAIN OFFICE: 40 RECTOR ST., NEW YORK 6, N. Y., PHONE HANOVER 2-7300



Hopewell, Va., P. O. Drawer 131 ..... Glenview 8-6301  
 Ironton, Ohio, P. O. Box 98 ..... Drexel 7-4366  
 Omaha 7, Neb., P. O. Box 166 ..... 29 1-1464  
 Raleigh, N. C., 704 Capital Club Bldg..... Temple 3-2801  
 San Francisco 4, Cal., 235 Montgomery St..... Yukon 2-6840  
 Columbia 1, S. C., 1203 Gervais St..... Alpine 3-6676  
 Atlanta 3, Ga., 127 Peachtree St., N. E. Jackson 2-7805  
 Memphis 9, Tenn., 1929-B South 3rd St. Whitehall 8-2692  
 Indianapolis 20, Ind., 6060 College Ave. Clifford 5-5443

## HOME MARKET

(continued from page 18)

total spring or first half year annual sales would be 80 x 500,000 pounds, which would amount to 40 million pounds or 20 thousand tons.

Now our object is to extend these garden centers to as many of our 800 stores as we possibly can; and if we do it fast, we will get a relatively large share of the total self-service market. But we cannot necessarily expect to extend the pattern of 1000 bags per store (and remember, this is spring usage) to all of our 800 stores, because meanwhile, in the next several years, we will be faced with increasingly severe competition from other self-service outlets, most of whom have been neglecting fertilizer just as we have. Those of you who know what Sears have been doing, will agree that Sears have not been neglecting the fertilizer market.

The next question is, "What is a garden center?" It is an attractive display of a number of related items for lawn and garden use. This display might be rather small — perhaps 10 x 10 feet, or even smaller. We are not thinking, in most of our stores, of anything like the Sears garden center, but 10 x 10 feet will create an impression on the consumer as he or she walks through the food store and will remind her in the spring, when perhaps she has not been foresighted enough to buy it in advance of the time it is needed. And because everybody goes into food stores, we will be able to sell through the impact of this display in much greater volume than we have sold in the past. This is what is meant by a small-size "garden center." It includes such items as rose fertilizer, garden hose, peat moss — not too many items. Maybe this "garden center" will be inside the store in a high-traffic location — or it could be on the parking lot under a tent of some sort.

This will be the technique that we will use to exploit the whole market, and this, I think, is essentially the technique that other outlets will use for fertilizer.

Of course, bigger garden centers are possible, and no doubt there will be such in a smaller number of stores. Such garden centers may occupy a space of as much as 2500 square feet and will sell a complete line of shrubs and evergreens and garden tools, as well as the main line big-volume items. But most self-service stores, super markets and others, will have smaller-sized garden centers.

I am sure that all of you shop oc-

asionally in super markets and are more or less conscious of how they merchandise. Doubtless you know that they rely on heavily advertised volume items at special prices to bring in week-end and holiday traffic. It is our opinion that fertilizer has been neglected in this respect. In the spring of the year, there is a considerable amount of promotion by super markets of such items as aluminum lawn furniture, garden hose, charcoal, and other such items. Since basically there is an excess of super market facilities now (in plain language there are too many big stores — a condition which has only existed for the last couple of years) — there is a great need for attractive "specials" which have the effect of bringing in new customers within a given store's neighborhood market.

One of our associated companies last year sold a considerable amount of fertilizer based on strong promotions in the spring. There were about four such promotions from March through May — the company is a West Coast company. In each promotion each store carried a display of 75 to 100 bags in the store with no attempt to set up a garden center, large or small. This display sold out during the weekend. The management of this company feels that many of the customers who came to buy this fertilizer were new customers. We expect that more of our chains will be doing this next year.

A very important question is whether super markets are offering the right fertilizer products to their customers. In a quality-conscious market, if they are not doing this, they will not be successful in obtaining a large share of home fertilizer sales. For reasons known to you, super markets and other self-service outlets have not hitherto sold the very popular, light-weight, high-formula fertilizer. We have concluded that we need such a quality fertilizer to do the job. Since there has been an effort to confine national brands of this type to non-self-service outlets, we probably will sell this product under our own brand. This is not just a necessary evil. If we promote a private brand, we will obtain a higher gross profit than a national brand would afford, and our brand will not be footballed in any market as has been the case with a leading national brand sold through super markets. It will not be footballed, and, therefore, it will be merchandised on a quality as well as on a price basis. We should be able to use it to bring traffic into the stores on

special promotions at low prices, and we also will be able to obtain a high gross profit on day in and day out sales at regular prices.

The successful merchandising of a private brand, however, requires the same ingredients that are necessary for a really successful national brand. The product must be packaged with maximum attractiveness. It must have high quality equal to the leading national brands, and it must be displayed and advertised effectively. We will not be in the fertilizer business next year under our own brand if we cannot buy a product that meets these quality specifications.

One responsibility that the merchant has with respect to fertilizer is to avoid selling ignorant customers a poor quality product. Taking advantage of customers in this manner is a very short-range approach. It has been tried and has not produced continuing large volume. I know of one chain that sold a very large amount of 2% nitrogen, a so-called "fish fertilizer" last year. There are other instances of selling poor quality through normally quality conscious super markets, and it seems likely that these instances often arise from ignorance on the part of the management. The number of customers who can be victimized in this way is doubtlessly dwindling, and what I consider to be the leading brand deserves a great deal of credit for this — I should think more credit than anyone else.

By taking great care with respect to the directions that are put on our package (including the spreader setting, which should be expressed in terms of the various major makes of spreaders which are on the market), we hope to take advantage of the present level of customer understanding with respect to fertilizer value and performance, and, in our small way, to extend and enhance the knowledge of our customers.

Our program will be based, therefore, on *maximum* value, and not on the assumption that the customer knows so little that he can be taken advantage of. We are quite sure, from experience, that this is a very poor assumption to make about *any* product sold through super markets.

I would like to close with two thoughts, as follows: (1) The key to an expanded urban market among chain store customers is the sale of quality fertilizer. (2) There is a real need for more statistics concerning the urban fertilizer market, and our organization would be glad to cooperate with the fertilizer industry in obtaining such statistics.



## ALABAMA

Armour has announced target dates for the start of operations at their multi-million dollar nitrogen fertilizer complex now under construction at Cherokee.

Robert L. James, of Atlanta, vice-president of the company and general manager of its Nitrogen Phosphate Division, reports that facilities for the production of ammonia and other nitrogen products are scheduled to be in full-scale operation by mid-March. Ammonium phosphate production is slated to get underway in April.

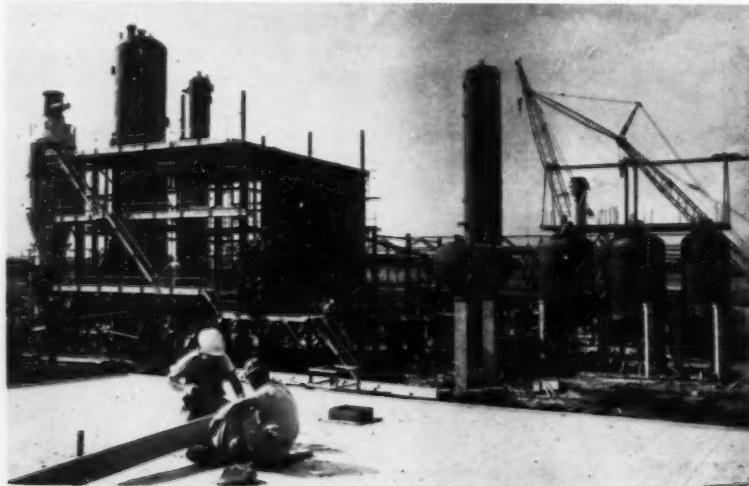
The new Armour facilities will include the largest single train ammonia plant in the world. The complex is located on a 1,200-acre tract of land at Cherokee. M. W. Kellogg Company, of New York, a subsidiary of Pullman, Inc., are engineering managers and are acting as coordinators for the entire project. Kellogg also is engineering, procuring the materials for and constructing the ammonia and urea plants, as well as being responsible for construction of all off-site facilities.

The Chemical and Industrial Corporation, of Cincinnati, Ohio, has the contract for engineering-procurement-construction of the nitric acid, nitrogen solutions and ammonium nitrate plants, while Chemical Construction Corporation, of New York, is handling the work for the construction of the ammonium phosphate plant.

Frank Dunbar, of Atlanta, manufacturing manager of Armour's Nitrogen Phosphate division, is serving as the company's coordinator for engineering and contracting on the Cherokee project.

### CONSTRUCTION PROGRESSING ON ARMOUR PLANT

Rapid progress is being made on construction of Armour Agricultural Chemical Company's new nitrogen fertilizer complex at Cherokee, Ala. Shown here is a view of the ammonia plant, which is scheduled to be in full-scale operation by mid-March, 1962. On a tract of 1,200 acres near Cherokee, the new Armour complex will provide employment for about 250 persons.



Construction of the facilities began in April of 1961, following official ground-breaking ceremonies. William Wood Prince, of Chicago, chairman of the board and chief executive officer of Armour and Company, manned the shovel for the occasion. Others taking part included E. W. Wilson, of Chicago, president of Armour and Company, and W. E. Shelburne, of Atlanta, president of Armour Agricultural Chemical.

Key people for the operation of the new facilities, including department heads and superintendents, already are located at Cherokee. Harold E. Maune, formerly head of Armour's Crystal City, Mo., nitrogen plant, is the manager of the Cherokee installation. Foremen and other plant personnel will be employed in the near future. Total employment is expected to be about 250.

Products to be manufactured and daily tons capacity of each are: ammonia, 360; urea, 50; nitrogen solutions, 250; nitric acid, 300; ammonium nitrate, 250, and ammonium phosphate, 500.

The Cherokee complex is part of a \$60,000,000 expansion program currently being undertaken by Armour.

The program includes construction of a phosphate plant near Fort Meade in Polk County, Fla. The company is also undertaking an extensive modernization program for its existing fertilizer mixing plants. There are 35 of these plants located in the United States, and one in Puerto Rico.

## CALIFORNIA

Ortho Division, California Chemical Company, has announced that construction is underway at the Ortho Richmond Fertilizer Plant on a new warehouse building for storage and bagging of ammonium sulfate. The building contract for the new facility has been awarded to F. P. Lathrop Construction Company of Berkeley.

The warehouse will be built with tilt-up concrete panel walls, and will contain about 26,000 square feet of floor space (20,000 for bulk storage of the ammonium sulfate and 5,400 for the bagging operations). The bulk storage section will be 80' wide x 260' in length and the bagging room will be 60' x 90'. The bagging room will be equipped with facilities for loading both trucks and rail cars.

The project is scheduled for completion by March, 1962.

AFC, Inc., of Edison began construction September 1 of their plant No. 2. The site selected is 8 miles east of Edison and is served by both the Santa Fe and Southern Pacific lines.

According to James Bonaventura, president, the first unit—a thirty hourly ton acidulation and granulation plants—will begin production of single and triple superphosphate on December 1.

A seventy daily ton ammonium sulfate and diammonium phosphate unit is scheduled to go into production at the beginning of 1962.

The expanded facilities will also include a bulk storage building with capacity of 12,000 tons.

Dominguez Fertilizers, owned equal-



ly by Shell, Stauffer and W. L. Dixon, has begun operations at Dominguez. The 60,000 annual ton plant is operated by Mr. Dixon, and is producing various analyses of ammonium phosphate, and some also with potash.

\* \* \*

**Los Alamitos Fertilizer Co.** has been organized in Orange County, with \$75,000 in \$100 per shares, by Harry Simon, Augustine G. Garcia, Anita Garcia and Tony L. Costello.

## FLORIDA

**International Minerals & Chemical Corporation** has added a high-analysis diammonium phosphate to its line of fertilizer materials.

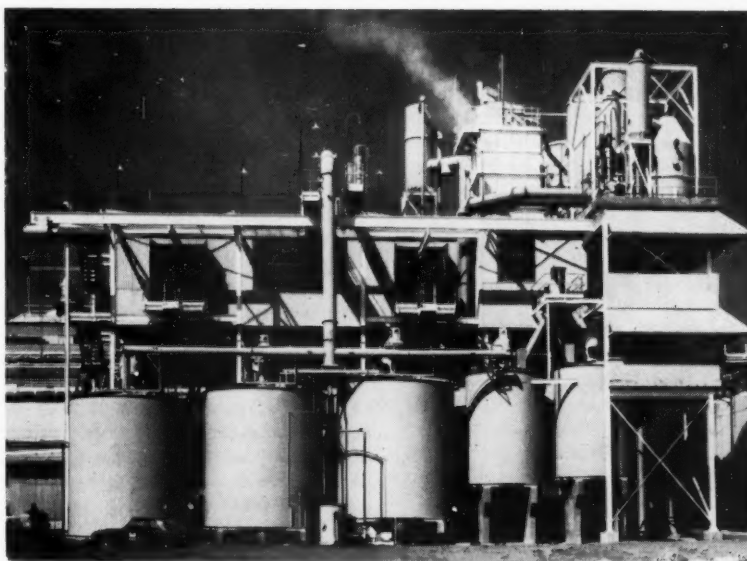
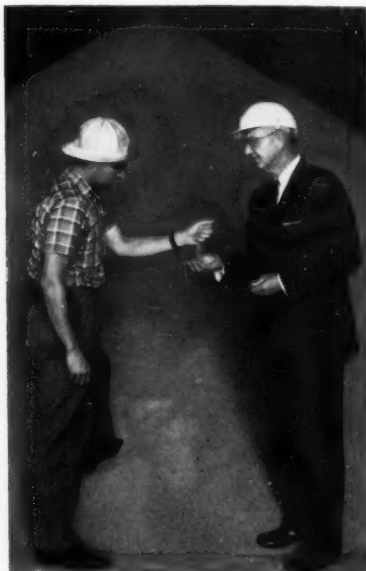
Early last month IMC began producing at its new multi-million dollar plant, which is adjacent to the existing agricultural chemicals plant at Bonnie. The new facility will have a capacity of 120,000 annual tons.

The new product, containing 18 per cent nitrogen and 46 per cent phosphoric acid, is one of the highest nitrogen content products of its type on the market, according to T. M. Ware, IMC president.

About 19 persons are employed at the highly-automated plant, which is designed to permit doubling of capacity with minimal interference with operations.

Diammonium phosphate produced

High-analysis diammonium phosphate comes off the production line in International Minerals & Chemical Corporation's new plant at Bonnie, Florida. Sampling the material are Floyd B. Bowen (right), general manager of IMC's Bonnie operation, and Ivan E. Phillips, project engineer for the diammonium phosphate minerals and chemicals operations of IMC's Agricultural Chemicals Division.



**SWIFT PHOSPHATE PLANT COMPLETED**

A shot of the new phosphate plant, built by Dorr-Oliver for Swift at Bartow, Florida. It is part of the Swift long range expansion program in the chemical field.

at the plant is currently stored at a nearby storage building and shipped by rail. IMC said the material will also be transported by river barge to other company-owned storage sites to facilitate delivery to Midwestern and Southern markets.

The diammonium phosphate from Bonnie will be available for direct application or as an ingredient for mixed fertilizers in these areas.

\* \* \*

**Swift & Company** have put into operation their phosphoric acid plant at

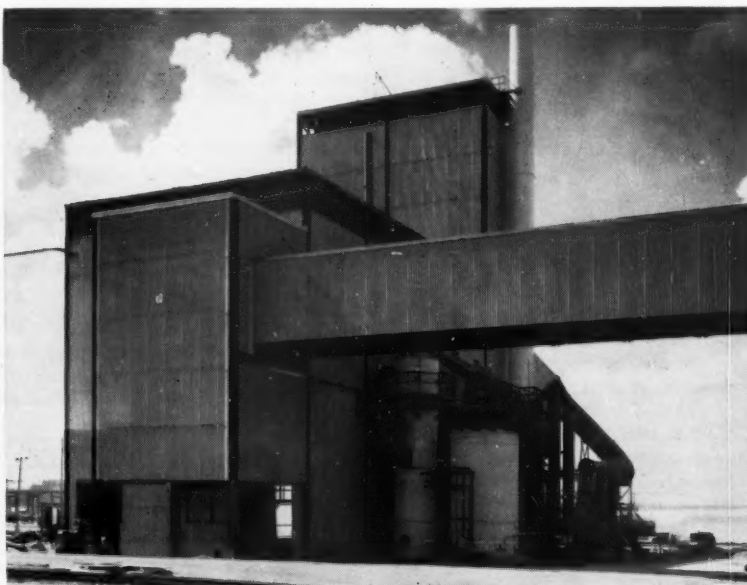
the Phosphate Center, south of Bartow. The plant was constructed by Dorr-Oliver Engineering Ltd., of Stamford, Conn.

W. F. Price, general manager of Swift's Agricultural Chemical division, said construction of the plant is a part of the company's long-range expansion in the chemical field.

Swift has had phosphate mining operations in the Bartow and Fort Meade areas for a number of years, and has a triple super phosphate

## IMC DIAMMONIUM PHOSPHATE PLANT ONSTREAM

Production of diammonium phosphate got underway recently in this new plant of International Minerals & Chemical Corporation at Bonnie, Fla. The multi-million dollar facility will produce 120,000 tons of the high-analysis material annually. The new material, which contains 18 per cent nitrogen and 46 per cent phosphoric acid, is taken to storage buildings via the housed conveyor in the center of the picture.



## —Around the Map...

plant in connection with its mining operations, and the new facilities will permit substantial increases in the production of triple super phosphate.

Swift also has under construction at the Florida site a new contact sulfuric acid plant, which is expected to be completed in April, 1962, and which will mean a further large increase in capacity.

In another chemical venture, Swift & Company joined with Skelly Oil Company in announcing plans recently to construct a \$10,000,000 nitrogen products plant in the Clinton, Iowa, area.

**US Phosphoric Products**, division of Tennessee Corp., has begun initial operation of the Leonard-Monsanto contact sulphuric acid plant at Tampa, built for them by Leonard Construction Company, Chicago, which handled engineering, construction and now the initial operation.

The plant uses Frasch process sulphur as raw material and is the largest unit of its kind in the world, Leonard reports. The new plant is part of US Phosphoric Products' expansion of its agricultural-chemical production.

### IDAHO

**International Minerals & Chemical Corporation** and **Husky Oil Company** have announced an agreement to develop phosphate reserves in Idaho estimated at 50 million tons.

IMC has extensive phosphate mining and processing operations in Florida. The reserves, owned by Husky, are located near Soda Springs, Idaho. They constitute one of the largest known reserves of surface mineable phosphate ore in the United States.

T. M. Ware, IMC president, said, "The center of gravity of fertilizer use has been moving and will continue to move westward. This source will give us a much better supply balance, meshing well with our production from Florida."

The agreement was described by Glenn E. Nielson, Husky president, as "an excellent opportunity for our company's participation in an important and exciting new area of activity, providing, as it does, for the productive and profitable use of these valuable reserves with the help of a recognized leader in the mining, processing, and marketing of food-producing minerals."

IMC recently sold industrial grade phosphate reserves in Tennessee to concentrate eastern production in Florida.

The agreement between IMC and Husky Oil allows up to five years for development of a final plan for undertaking the joint venture. In the event Husky should, for any reason, decide not to enter the project, the agreement provides an equitable basis for sale of the deposits to IMC.

### IOWA

**Goode Fertilizer Company**, Fairfield, recently organized, will build a mixing plant there with storage capacity of 1,000 tons of pelleted fertilizer, and anhydrous ammonia storage for direct application. Owners include Olen Goode of Goode Elevator Co., and Donald J. Fosdick, formerly with Ke-Wash Fertilizer.

**Olin Mathieson** nitrogen-phosphate fertilizers will be distributed from Dubuque by Dubuque Dock Company in the Industrial Park there, from a new \$250,000 fertilizer distribution plant being constructed there. The plant will bag, store and handle the Olin goods, and is one of several such supply plants located along US waterways.

### KANSAS

**Spencer Chemical Company** has announced that a new plant to produce specialty organic chemicals is under construction at the company's Jayhawk Works near Pittsburg. The initial product of the new facility will be 'Carbyne,' the weed-killer developed by Spencer research.

P. C. Denton, president, said that design of the new facility will permit the production of a broad variety of specialty organic chemicals in addition to Carbyne. The expansion is Spencer's first venture into the manufacture of organic chemicals.

Production of Carbyne in the new plant is scheduled to begin in the summer of 1962 with a capacity sufficient to supply Spencer's domestic and export requirements.

### MARYLAND

**Hampstead Feed & Fertilizer Co.** was visited by a fire which destroyed their main and grain storage buildings at Hampstead.

### MISSISSIPPI

**Riverside Industries** has established at Kosciusko a fertilizer and insecticide manufacturing plant, similar to

their operations at Pontotoc, Tupelo, Starkville and at the home office in Marks. The new plant is housed in an 8,000 square foot steel and concrete building, plus storage for feed and seed of some 7,200 square feet.

**D. L. Wesley and Sons** have begun construction of a bulk blending plant at Poplarville, which should be in operation by the end of the year.

### NEW MEXICO

**Climax Chemical Co.**, Houston, Texas, has turned over to Leonard Construction Co. the engineering and construction of the Leonard-Monsanto contact sulphuric plant at Hobbs, New Mexico. The plant is expected to have a daily capacity of 150 tons derived from hydrogen sulfide and recovered sulphur, and should be ready about May.

### NEW YORK

**Cherokee Securities Corp.**, New York City, holds leases for 30,000 acres of a 450 square mile phosphate area in Beaufort County, North Carolina, which is said to be the largest phosphate reserve in the world, not now being worked.

The N.C. Board of Conservation and Development has been told that a \$12,000,000 phosphate and processing plant in the area could result from \$60,000 spent by the State to test a hydraulic mining method, proposed to work the area.

**International Sure-Gro Corp.**, to be located within the County of New York has been organized with capital stock of \$50,000 by Ben F. Lee and Robert L. Seidman.

### OHIO

**Youngstown Fertilizer Co.** had destruction to the extent of some \$30,000 when fire gutted the interior of their plant at Youngstown.

**Columbus'** waterworks service director, Ernest H. Stork, has suggested that the limestone sludge which now forms a large white stain on the Scioto River could be salvaged to make a fertilizer ingredient and for other uses. Pointing out that other cities reclaim such sludge from their waterworks, Mr. Stork admits that a reclamation plant is too costly for the city's present budget. But the State Health Department has directed steps be taken to stop pollution of the river.

## SOUTH DAKOTA

**Farmers Union Central Exchange**, South St. Paul, Minn., is building at Lake Preston a bulk fertilizer blending plant, which they call a soil service center, similar to the one near Sioux Falls, which was the first of its kind in South Dakota and has been in service for about a year. A third such plant is due to be put up at Britton. The Central Exchange operates 15 other plants of this type in North Dakota, Minnesota and Wisconsin. They offer the farmer a complete fertility program, from soil testing on. The new plant is almost completely automatic.

## TENNESSEE

**Boyle Phosphate Co.**, Centerville, is in the midst of expansion of its phosphate storage facilities. M. R. Kimbro is plant manager.

## TEXAS

**Phillips Chemical Company**, wholly owned subsidiary of Phillips Petroleum Company, has started construction of a new 10,000-ton bulk ammonium nitrate storage facility and is revising the bagging and shipping equipment at its Cactus ammonium nitrate plant near Etter in the Texas panhandle.

Completion of the new facilities and revisions at the ammonium nitrate plant will enable the company to offer improved delivery service on both bulk and bagged ammonium nitrate fertilizer.

The new storage, scheduled for completion in February, will increase the company's shipping flexibility and permit large-volume bulk shipments of ammonium nitrate fertilizer in season.

Revision of the bagging and shipping facilities, to be completed in June will permit a change-over from valve-pack bags to open-mouth sewn bags.

**United States Sulphur** has by this time resumed production at its High Island plant, which was shut down because hurricane Carla interrupted its supply of gas.

**Tuloma Gas Products Co.** (See Changes) are planning a large anhydrous ammonia plant at Texas City, plus storage terminals of 30,000 ton capacity at Texas City and Wood River, Ill., plus a 25,000 ton terminal at Joliet, Ill.

**Ferilome** will build a new plant at

Bonham, which will have \$750,000 annual payrolls, according to H. Dean Smith, president of Hi Yield Fertilizer in Bonham. The Ferilome operation is moving to Bonham from Mt. Pleasant and will build adjacent to the Hi Yield plant.

## UTAH

**Texas Gulf Sulphur** is progressing with its \$30,000,000 potash project at Moab. The 22 foot diameter shaft is down below the 640 foot level, well on its way to the projected 2800 foot depth a \$5,000,000, thirty-nine mile railroad is moving forward, and the foundations are laid for the warehouse which will store 125,000 tons of refined potash. The plant complex is expected to cost \$25,000,000.

## WYOMING

**Pure Oil** has awarded to Roger Mfg. Co. of Denver contract for construction of the Worland ammonia plant which is slated to have capacity for 30 daily tons.

**American Humates** plans to build, for completion by February of next year a fertilizer plant scheduled to produce 12,000 annual tons of leonhardtite to be sold in bulk. The plant will be located at Glenrock.

**Multi-Mineral Products** of Billings, Montana has leased a second of two big sulphur deposits near Cody. They are planning to expand operations and now have 50,000,000 tons of sulphur to back up the program.

## ARGENTINA

**Petroquímica Argentina** has selected to build its \$70,000,000 petrochemical plant near San Lorenzo the foreign affiliate of Fish Engineering Corp. of Houston, Texas—Fish International of Panama. The complex, already under way, is expected to take 36 months to complete.

## BRAZIL

**Compania de Abubos e Materiais Agricolas de Bahia** will set up a fertilizer plant at Itabuna. The initial investment will be 20,000,000 cruzeiros.

## COLOMBIA

**Abonos Colombianos** announces that its fertilizer plant near Cartagena will be in production by next August.

## DENMARK

**Grenea** nitrogen plant has reached the award stage. A 40,000,000 kroner contract for construction has been awarded to the English concern, Power & Gas Corp. Ltd., Parkfield Works, Durham. The plant should develop capacity for 75,000 annual metric tons of 26% ammonium nitrate and 100,000 tons of liquid ammonia.

## ETHIOPIA

**Ralph M. Parsons Co.**, Los Angeles, has been granted a potash mining concession in Eritrea and expects to spend \$15,000,000 in development projects. These to include facilities at Dalol and new Red Sea port of Dalol.

## GREECE

**OWA Organization**, responsible for national industrial development, is planning erection of an ammonium phosphate facility with capacity reaching 250,000 annual tons. It is expected that some of the 16-20-0 product will be exported until demand, projected for 1964 at 130,000 tons, catches up with outfit. This is expected to develop by 1970.

## INDIA

**Fertilizer Corporation** has signed with Burmah-Shell for 50,000 tons of refinery gas to supply the projected 90,000 ton Trombay plant.

They have also decided to increase the size of the projected plant at Nahorkatiya in Assam from 32,000 annual tons in terms of N. The precise increase has not yet been decided.

Fertilizer Corporation manages both Sindri and Nangal plants.

## JORDAN

**Arab Potash Co.**, Amman, has awarded to Western Knapp Engineering of San Francisco a contract for consulting engineering service of their 250,000 ton potash plant.

## MEXICO

**Fertilizantes de Monclova** will undertake an \$800,000 expansion of their fertilizer plant. Fertilizantes del Occidente will build a fertilizer plant near Guadalajara.

## PAKISTAN

**Multan Fertilizer Factory**, which was forced to close down by the

(Concluded on page 46)



## Continental Conveyor Announces Expansion

Nelson J. Kemp, chairman of the board of Continental Conveyor and Equipment Company, has announced the immediate start of an expansion program for the company's plant at Winfield, Ala. The program will add 15 thousand square feet of manufacturing area and three thousand square feet of office area for additional engineering and sales personnel.

"Also included in our plans," Mr. Kemp said, "are new facilities which will enable us to broaden our line of materials handling equipment, as well as increase volume of production."

Construction on the plant addition is scheduled to start immediately. Some additional facility purchases have already been made.

## Arizona Fertilizer Firms Okay Merger Plan

Merger of Arizona Fertilizer and Chemical Co. and Southwest Agrochemical Corporation has been approved by the board of directors of both firms.

The merger was subject to approval by stockholders of both firms at meetings Nov. 24 in Phoenix.

Southwestern Agrochemical is owned by approximately 675 farmer-growers. It has home offices in Chandler and operates two plants near Chandler and one near Kyrene. It also owns a 50 per cent interest in Southwestern Nitrochemical's Chandler plant.

Agrochemical's sales last year totaled in excess of \$3.5 million and its assets exceed \$5.4 million.

Arizona Fertilizer has home offices in Phoenix and operates two plants in this city and plants in Wilcox, Toltec, Yuma, and El Centro and Blythe, Calif.

Its sales last year exceeded \$5.5 million and assets are about \$4.5 million.

Arizona Fertilizer will be the continuing company, but its name will be changed to Arizona Agrochemical Corp.

Agrochemical stockholders will receive 14 shares of the merged company stock for each share they hold in Agrochemical.

There are no major personnel or plant changes anticipated now. However, the home office of the merged companies will be located at Arizona Fertilizer's present headquarters, 734 Southern Pacific Drive, Phoenix.

Frank M. Feffer Sr., president of Arizona Fertilizer, will serve as president of the combined companies.

# INDUSTRY

## Brewer Buying Plant From Pacific Fertilizer

C. Brewer and Company will purchase Pacific Chemical and Fertilizer Company's Hilo fertilizer and chemical materials plant for an undisclosed price on December 31.

Boyd MacNaughton, Brewer president, made the announcement.

Brewer has formed a new subsidiary, Ultramar Chemical Corporation, to own and operate the Hilo plant.

The plant will continue to supply current customers.

Anthony Kuhlman, formerly mill superintendent of Hakalau Sugar Company, has been named plant manager.

Pell Company, another Brewer subsidiary, will be Ultramar sales agent.

## Rapids Machinery Adds Facilities

Rapids Machinery Company, Marion, Iowa, manufacturers of Marion horizontal mixing equipment, announce the recent completion of additional manufacturing and warehouse facilities.

A 40' x 60' steel and concrete addition is attached to the present plant in Marion. The building features a crane for loading and unloading purposes, added ceiling height for the fabrication of special items such as surge bins, weigh hopper scales, special Marion mixing units and off-street facilities for loading and unloading within the plant area. Visitors are welcome at all times.

## Farm Consumer Panel For Riedeburg Associates

Theodore Riedeburg associates, New York, announced last month the addition of a Farm Consumer Panel which will be used in their market consultant work. Mr. Riedeburg stated that this unique panel classifies farmers right down to income, type of farm, amount of acreage, types of crops and products used and has a range capable of producing more exacting information than ever before possible in this field.

Mr. Riedeburg announced that the Farm Consumer Panel will be utilized in all of his consulting work. The panel will also be available to major corporations for use in conjunction with their own marketing departments.

## Wheelabrator Acquires Criswell Filter Firm

Acquisition by Wheelabrator Corporation of Mishawaka, Indiana, of the W. W. Criswell Company, Inc. of Riverton, New Jersey, manufacturer of filtration products, was announced October 4 by Harold M. Miller, senior vice president of Wheelabrator.

The Criswell company produces all types of fabricated bags and blankets for filtering solids from gas or liquid streams. The cloths are made from natural (cotton and wool) and synthetic (glass, nylon, orlon, dacron, etc.) fibers.

The purchase includes a new 22,000 square foot facility in Riverton, which was occupied this year. Previously, the eight-year-old company operated in Philadelphia.

Mr. Miller said the present management, headed by W. W. Criswell, Jr., president and founder, will continue to operate the New Jersey company.

The acquisition of Criswell will complement products of Wheelabrator which manufactures dust and fume collection equipment. Wheelabrator is a subsidiary of Bell International Corp.

## Bemis Takes Over Plastic Film Co.

Bemis Bro. Bag Company has entered into an agreement with the Plastic Film Company, Inc., of Plainfield, Conn., to acquire the assets and business of the corporation as of January 2, 1962, according to a joint announcement by Chairman F. G. Bemis and William B. Nichols, president of Plastic Film.

Plastic Film sales in the fiscal year ended September 30, 1961, were \$12,500,000. It specializes in the coating and laminating of a wide variety of materials, including paper, plastics, foil, and films.

Plastic Film will be operated as a wholly owned subsidiary of Bemis. Its present management will continue with Mr. Nichols becoming chairman of the board, A. C. Bruce, president, and E. V. Disch, vice president and general manager. A. E. Anderson, T. A. Lancaster and D. C. Merritt will continue as vice presidents.

Plastic Film will become the fifth subsidiary which Bemis has acquired or formed during the past 2½ years.



# CHANGES

## Calchem Announces Ortho Reorganization

Fred Powell, president of California Chemical Company, has announced a major reorganization in the marketing department of Calchem's Ortho division.

Mr. Powell also disclosed appointment of F. J. Juchter as manager of Calchem's Supply and Distribution Department, a new position within the company. Mr. Juchter formerly was the Ortho division vice president in charge of manufacturing.

Reorganization changes in the Ortho Marketing Department include the creation of a national marketing staff and regrouping of sales districts throughout the United States.

In conjunction with the reorganization, H. J. Grady, president, Ortho division, has announced the following appointments:

The newly-created marketing staff, which will be directly under M. E. Wierenga, Ortho vice president and manager of marketing, includes C. E. Cody as national sales manager for agriculture; E. L. Strippling, Jr., national products manager for pesticides; W. E. Jaqua, national products manager for fertilizers; and C. E. Jones, Jr., national sales manager for garden & home products.

C. M. Crutchfield takes over as manager of product development and market research; G. H. Johnson as national operations manager; Dr. M. H. McVickar, national manager of agronomy; and C. H. Lupsha, assistant national products manager, pesticides.

V. A. Bryant, formerly the assistant western regional manager, has been named special assistant to marketing manager Wierenga.

G. L. Dokken has been appointed Marketing Administrative Assistant for Ortho and becomes responsible for administrative policies and procedures of Ortho marketing offices throughout the nation. He has been with Ortho for 10 years.

Mr. Grady's regional appointments include K. J. Dietzen as garden & home sales manager for the South; J. A. Rice, Jr., garden & home sales manager for the East; and D. P. Hogan, Jr., garden & home sales manager in the West.

The Ortho district managers and their areas as outlined under the regrouping of sales districts are: Dr.

Lemac Hopkins, Portland Oregon; Dr. R. T. Wallace, Sacramento, California; G. G. Black, Fresno, California; G. L. Wood, Whittier, California; F. X. Vaughn, Dallas, Texas; E. B. Acree, Atlanta, Georgia; D. B. Maughan, Orlando, Florida; G. W. Oliver, Haddonfield, New Jersey; R. B. Price, Toledo, Ohio; R. C. Yapp, Des Moines, Iowa; F. R. Uttermohlen, Honolulu, Hawaii.

## Simonsen Manufacturing Expands Plant 25%

An expansion program to increase manufacturing facilities by 25 percent has been completed by the Simonsen Manufacturing Company, Quimby, Iowa. According to Merle Simonsen, manager, rapid development of the Simonsen Manufacturing Company into a full line manufacturer of bulk feed and fertilizer bodies necessitated a speed-up of normal anticipated expansion plans.

The overall objective of the company, growth-wise, Mr. Simonsen added, is to expand along lines that will help to maintain high volume production more on a round-the-clock basis. He said there is evidence, in the company's experience, of a growing need for certain types of equipment in the area of their manufacturing specialty that runs contra-seasonal in nature to that of other types produced.

## Universal Hoist Under New Management

The Universal Hoist Company, Cedar Falls, Iowa, has been purchased by Gail G. Bonneson. Founded in 1906 by John Voorhees, management of the company has been in the Voorhees family until the present transfer of ownership.

Mr. Bonneson, a CPA and a resident of Hudson, Iowa, has been active with Universal for the past four years as comptroller and more recently in the capacity of acting general manager.

In announcing the purchase, Mr. Bonneson stated: "More aggressive steps will be taken immediately to insure customer satisfaction through distributor education, factory field service, and improved quality control. Product research and development will be strengthened in order to produce a broader line of equipment and maintain Universal Hoists' position as a leader in the material handling equipment industry."

## Tuloma Expands Nitrogen Program

A major manufacturing, distribution, and marketing expansion program for nitrogen fertilizers has been announced by Tuloma Gas Products Company, Tulsa, Oklahoma.

The growth program, outlined by Tuloma's new vice president for nitrogen products, C. J. Struble, includes construction of an additional anhydrous ammonia plant to increase Tuloma's supply of product, the building of refrigerated barges, installation of two new storage terminals, the enlargement of a third storage facility, and expansion of marketing outlets nationally.

Struble said that affiliated American Oil Company will construct a large anhydrous ammonia plant in Texas City, Texas. Both companies are wholly owned subsidiaries of Standard Oil Company (Indiana). Construction will begin as soon as current engineering studies can be completed and construction contracts can be awarded. (See Map).

Also in the expansion move, Schrock Bros., Tuloma's wholly owned subsidiary, will be enlarged. Schrock now markets anhydrous ammonia and other fertilizers through its own retail outlets in the middle West. In addition, it manufactures and services equipment that directly applies anhydrous ammonia into the soil.

Tuloma is the nation's fourth largest marketer of LP-Gas. With the recent transfer of nitrogen products marketing from American Oil, Tuloma will become a leading seller of anhydrous ammonia. Present ammonia marketing activities center in the corn belt where products are supplied from the Calumet Nitrogen plant at Whiting, Indiana.

## Hooker Division Forms Ag Chemicals Group

Hooker Chemical Corporation's Eastern Chemical Division has realigned its sales department to include a marketing group responsible for the division's marketing and development activities in the field of agricultural chemicals.

James S. Walker heads the group as manager—agricultural chemicals, and he expects to announce his staff in the near future. Mr. Walker is responsible to Charles Y. Cain, division sales manager, who made the announcement.

Joseph E. Thornberg succeeds Mr. Walker as manager of sales administration. He will also retain market research responsibilities of his previous assignment.



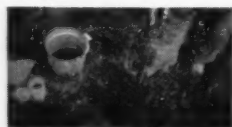
## FILLING THE NEED FOR PHOSPHORUS

*American Cyanamid Company completes the phosphorus story with facts about the need for—and the results of—phosphate fertilization*

The October and November reports explained why phosphorus is an indispensable plant food; phosphorus fixation and how to make it work for you; why yearly phosphorus fertilization is needed by most crops.

This final report locates areas of phosphate deficiency and shows how crops respond to phosphate fertilization.

**We're using up the phosphate reserves in our soils**  
Each year an average of about 3 lbs. of phosphorus is removed from U.S. soils for each 2 lbs. returned.



In order to know how much phosphorus your soils need, you must know how much they have. Soil testing is the way to find out.

This deficit is consistently greater in some soils. For example, most pastures receive only a fraction of the phosphorus they need... if they get any at all. On the other hand, intensively cultivated crops such as vegetables, tobacco, and potatoes, get more than they can use.

This over-fertilized crops over many a surprising phosphate fertilizer. Other crops! A can explain this. **Now phosphorus got the Early American virgin soils**

Will you missed these

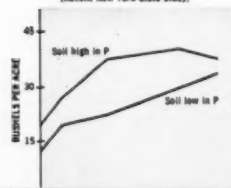
phosphorus, soon learned that phosphate fertilization increased yields. By 1900, phosphates had become the major fertilizer used.

After decades of fertilization and cropping, many—but not all

trated in the top few inches of soil. This encourages shallow rooting and retarded growth in dry years. Efficient production demands adequate available phosphorus throughout the root

never seen a pound of phosphate fertilizer. Forage crops respond as much as cash crops, and often give a greater return per dollar invested in phosphorus, other plant nutrients, and lime.

HOW GRAIN RESPONDS TO PHOSPHORUS AND LIME  
(Recent New York State study)



phosphorus is "fixed" soils after application. But, when soils are properly managed, fixed phosphorus can be made available. Thus, like money in the bank, phosphorus in the soil... but can be released to increase income — just capital investment.

**Where do we go from here?**

Production is growing more efficient through control of all phases of agriculture: crop varieties, irrigation, management, etc. The weakest link. Efficiency is the weakest link.

NUMBER 2 IN A SERIES OF 3 REPORTS...



## PHOSPHORUS FERTILIZATION

*American Cyanamid Company presents facts which will help you with phosphate fertilization*

Last month's report explained why phosphorus is the "indispensable" plant food; why only a small part of the phosphorus in your soil is usable by crops as plant food; how phosphorus quickly becomes "tied up" or "fixed" by forming compounds from which phosphorus is unavailable to most plants; and what you can do to make the phosphorus in your soil more available to your crops.

The present report discusses phosphate fertilization — when and how to apply phosphate fertilizers.

ply is used during the year of application.) As total phosphorus in the soil increases, so does the amount that is available to your crops... if you manage your soil properly. Eventually, enough phosphorus can accumulate so that the amount converted from the fixed forms will be enough to supply a good share of the annual crop needs. Where, before, larger amounts of phosphorus fertilizers had to be applied to get enough available phosphorus to crops, now smaller amounts will do, because much of the phosphorus requirement will come

tration of available phosphorus to get crops off to a good start. Later, when root systems are better developed and able to absorb more phosphorus, the crops will be able to get enough phosphorus from these well-supplied soils.

### Timing and placement of phosphorus fertilizers

Phosphorus fertilizers are applied to increase available phosphorus for the coming crop and to build up the total phosphorus in soils with low phosphorus reserves.

Available phosphorus is quickly fixed in many soils. In

tilizers in bands. By placing the fertilizer in the soil, phosphorus is not as when mixed there. Also, crop roots reach phosphorus more quickly, of the fertilizer is the young plants. Placement is more acid and other "high low in phosphorus."

On the other hand, stay in for two years must have their a supplied by top dress phosphates top-dress surface of the soil at inch or two of the so move into the root fore, for hay and p such as alfalfa and it is important to ap amounts of phosphorus them into the plow soil when the seed pared. This extra su

NUMBER 1 IN A SERIES OF 3 ARTICLES...



## PHOSPHORUS...

*American Cyanamid Company explains the problem of getting enough of this indispensable plant food... and what to do about it*

Every crop needs nitrogen, phosphorus, potassium, and other elements. Each crop needs these elements in a certain proportion. Different soils supply differing amounts of these plant foods. Therefore, the amount to be supplied by fertilizer will vary, depending on soil type, the amount of plant food already in the soil, and other factors. That's why fertilizer manufacturers offer such a wide range of mixed fertilizers. American Cyanamid Company believes the best way to get the most from your fertilizer program is to understand each plant food... what it does and how to use it.



Numbers tell percentages of nitrogen, phosphorus ( $P_2O_5$ ), potash ( $K_2O$ ) in mixed fertilizer. The ratio depends on crop need and amount of nutrient in soil. Article discusses problem of phosphorus fertilization.

This is the first of three articles\* in which Cyanamid presents

has a different job and a deficiency of each produces its own special symptoms.

When plants don't get enough phosphorus, growth slows; roots are stunted and not properly branched; blossoms, fruits and seeds don't develop properly. Yields are low, and often maturity is delayed.

In livestock, phosphorus is part of many body processes, such as conversion of feed to energy and formation of strong bones and teeth. Animals on phosphate-deficient feed and forage develop depraved appetites (they will actually chew bones), and will dissolve phosphorus from their own bones to supply enough for other body functions.



Purpling of leaf edges reveals serious phosphorus deficiency. Growth and fruiting are slowed, yields cut long before these symptoms show up.

plants can't take up sufficient nitrogen or potash for high yields.

Another way in which phosphorus increases availability of nitrogen is in legumes. Legumes take free nitrogen from the air and convert it to plant food... if they are first supplied sufficient phosphorus!

**Why phosphorus fertilization is a problem**

There's an average of 1000 lbs. of

Plant roots take up most of their nutrients from the soil solution. That means most plant food entering the roots must be dissolved in soil water. Yet, over 99% of all phosphorus in the soil is insoluble in water. It is part of many complex compounds and has become "tied up" or unavailable to plants. Soil scientists call this process "phosphate fixation." Less than 1% is phosphorus that is readily available to plants!

### How phosphorus is "tied up"

Phosphorus is a very "active" element. That's why it's never in pure form in nature, and why it so quickly forms many complex compounds with other elements in the soil. If you handle your fertilizer and soil building program properly, you can actually make available more of the phosphorus "tied up" in the soil or applied in fertilizers. If you mis-handle soils and fertilizers, you can speed phosphorus fixation. While you can legitimately consider "tied up" phosphorus as "stored" in the soil, it can be released only by proper management.

### What to do to make more phosphorus available

Here are some of the things you can do to make available more of the phosphorus you already have... and that which you add in fertilizers.

**Liming** — A most important fac-

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These fertilizer manufacturers use  
Cyanamid phosphate products\* in  
their quality mixed fertilizers:

Local and regional fertilizer manufacturers are  
linked to this program by a listing in the last column  
of each advertisement. These advertisements will be  
put into booklet form, and made available for distri-  
bution by manufacturers and dealers. If you wish a  
supply, please write for details.

## A FERTILIZER PROMOTION PROGRAM OF MAJOR IMPORTANCE TO THE INDUSTRY

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**PHOSPHORIC ACID**—This high-  
analysis, liquid phosphate is be-  
ing used in increasing amounts  
by manufacturers of high-analy-  
sis fertilizers. Direct application  
uses also are being developed.

There are other sources of  
fertilizer phosphates, but they  
are less widely used.

### Which phosphate fertilizer should you use?

Most likely, most of the phos-  
phate fertilizers you apply to feed  
your crops will be mixed ferti-  
lizers, rather than straight phos-  
phate materials. The analysis of  
the fertilizer you buy is shown on  
the bag or attached tag. The  
important thing to you is the  
amount of available phosphate  
the analysis guarantees (usually  
given as  $P_2O_5$ ). The source makes

These fertilizer manufacturers use  
Cyanamid phosphate products\* in  
their quality mixed fertilizers:

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too alkaline, unavailable com-  
pounds are formed with calcium.

Soil acidity is measured on  
the "pH scale" from 1 to 14. As  
the soil pH goes below 7, soils are  
acid; higher than 7, alkaline. The  
ideal pH range for most crops  
is from 6 to 6.5. In this range,  
phosphorus is most available.  
Thus, in highly acid soils, liming  
alone increases the phosphorus  
available to crops.

**Organic matter**—Liming re-  
leases phosphorus in another  
way. Some unavailable phos-  
phorus compounds are "organic."

These fertilizer manufacturers use  
Cyanamid phosphate products\* in  
their quality mixed fertilizers:

PHOSPHATE CONTAINED IN HARVESTED CROPS		
CROP	YIELD PER ACRE	LB. OF $P_2O_5$ REMOVED
CORN (grain)	100 bu.	30
SOYBEANS (grain)	2 tons	75
WHEAT (grain)	40 bu.	25
BARLEY (grain)	1.5 tons	5
OATS (grain)	80 bu.	20
RYE (grain)	2 tons	15
ALFALFA (hay)	5 tons	40
ORCHARD GRASS (hay)	2 tons	10
Timothy	5.5 tons	25
CARROTS	30 tons	30
POTATOES	400 bu.	30
TURNIPS	15 tons	30
CITRUS (seed and hull)	1500 bu.	15
ORCHARD (seed & hull)	1500 bu.	15

These organic compounds in crop  
residues are constantly being  
broken down by bacteria, and  
this process releases soluble  
phosphorus. Bacteria are not  
very active in acid soils. Lime re-  
duces acidity, increases bacterial  
activity and thus the supply of  
available phosphorus.

The plow-down of cover crops

products:  
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Superphosphate  
economical  
high-analysis

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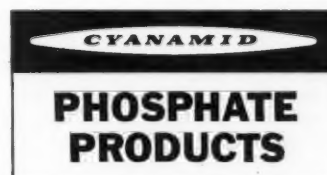
ED  
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In these three advertisements—  
appearing in *Farm Journal* and  
*Progressive Farmer*—American  
Cyanamid Company sets forth  
the role of phosphorus, and ex-  
plains how best to handle soils  
and fertilizers for adequate phos-  
phorus nutrition.

As a major producer of phos-  
phates for fertilizer, we're mind-  
ful of two important facts: *One*  
—the prosperity of the entire  
agricultural community, includ-  
ing its suppliers, depends on how  
well America's land is farmed; *Two*  
—America's phosphate re-  
serves are not inexhaustible. Cy-  
anamid hopes these reports will  
contribute to both *sufficient* and  
*efficient* use of phosphates in a  
well-balanced fertilizer program.  
The advertisements are summed  
up this way: "Use enough pounds  
of fertilizer...and get the most  
from every pound you use."

We believe that only *methodi-  
cal effort* to increase general un-  
derstanding of fertilizers can  
bring total fertilizer usage up to  
*recommended* levels.

American Cyanamid Com-  
pany, Agricultural Division,  
Princeton, New Jersey.



CYANAMID SERVES THE MAN WHO  
MAKES A BUSINESS OF AGRICULTURE



## Escambia

Three new sales representatives have been added to the nitrogen sales force of Escambia Chemical Corporation.



Avin



Salter



Jeffery

Ralph E. Avin, who will represent them in North and South Carolina. He has been with the Pamplico Fertilizer Company in Pamplico, South Carolina, for the past six years.

Henry E. Jeffery, Jr., who will represent Escambia in North Alabama and Tennessee. Well-known to the fertilizer industry, Mr. Jeffery was with the Southern Cotton Oil Company from 1933 to 1955 when he left to serve as assistant general sales manager of the F. S. Royster Company.

Frank T. Salter, who will represent Escambia in Mississippi and Louisiana, has been with Ashcraft-Wilkinson as a sales representative, a position he resigned to accept a similar one with Escambia.

This brings to nine the number of sales people added to Escambia's nitrogen sales office since it began handling nitrogen sales on a direct basis July 1.

## W. Va. P & P

Two additions have been made to West Virginia Pulp and Paper Company's sales forces, it was announced by Jason M. Elsas, sales manager for the company's multiwall bag division.

Robert J. Giger has been appointed special account executive for the Western district, working out of the company's Torrance, Calif., plant. He will report to J. Frank Greeley, Western district sales manager.

David D. McClintock has been appointed sales representative for the Chicago district and will report to H. L. Frizzell, sales manager for that district.

# PEOPLE in the

## U. S. Borax

The promotion of James R. Turner to the post of assistant director of plant food chemical sales for United States Borax and Chemical Corporation is announced by J. F. Corkill, vice president for marketing. Mr. Turner joined U. S. Borax in 1952 as an agronomist. He has been serving most recently as manager of plant food product development.

In his new position, he will report to John E. Fletcher, director of plant food chemical sales.

Charles M. Reading, formerly manager of the West Coast division of the Socony-Mobil Engineering department, has joined U. S. Borax as Los Angeles engineering manager, it is announced by Dr. D. S. Taylor, vice president in charge of the technical department. He will report to L. L. Fusby, assistant chief engineer.

## Smith-Douglass

R. R. Yeager, 33-year-old native of Peoria, Ill., has been named superintendent of the Smith-Douglass fertilizer manufacturing plant at Columbus, Ohio.



Yeager

Dale C. Kieffer, fertilizer production manager for Smith-Douglass, made the announcement from the company's home office in Norfolk, Va.

Mr. Yeager joined Smith-Douglass in 1953 as assistant chemist at Streator, Ill. In 1955, he was transferred to Albert Lea, Minn., where he served first as plant chemist and later as plant chemist and assistant superintendent.

## Niagara Chemical

Appointment of Dr. Oscar Johnson as marketing director of the Niagara Chemical Division, FMC Corporation, has been announced. Dr. Johnson will now be concerned specifically with planning and directing all marketing functions, with responsibility for the overall direction of technical chemical sales, market research, advertising and promotion, purchasing, and Niagara's sales development program.

## Armour

J. L. Rainey has been appointed manager of the Ris-Van division of Armour Agricultural Chemical Company, according to an announcement from Atlanta headquarters of the firm.



Rainey

Mr. Rainey joined Ris-Van, at its Belmond, Iowa headquarters in December of 1960, as sales manager.

Previously he was midwest sales supervisor for the Nitrogen Division of Allied Chemical Corporation, with headquarters in New York City.

## Goode Fertilizer

Donald J. Fosdick, former general manager of Ke-Wash Fertilizer Company, has joined the newly organized Goode Fertilizer Company, Fairfield, Iowa, as a partner. (See Map, page 26).

## Riverside Industries

T. M. Waller has resigned as associate agronomist for cotton work of the Mississippi Agricultural Extension Service, State College, to become agronomist for Riverside Industries, Marks, Miss. He became a specialist of the Extension Service at State College in 1947. (See Map, page 26).

## Continental Can

Rupert F. Hobbs has been added to the sales staff for multiwall bags in the Paperboard & Kraft Paper division of Continental Can Company, it was announced by D. H. Johnson, manager of multiwall sales.



Hobbs

Mr. Hobbs' territory includes Michigan, Indiana and Ohio, and he will operate out of his home in Cuyahoga Falls, Ohio. He comes to the company after experience with several other multiwall bag producers.

Continental manufactures a full line of multiwall bags at its Hodge, Louisiana paper mill.



# INDUSTRY

## Tennessee Corp.

Beal D. Hargrove has been appointed as senior agricultural analyst in the marketing research and development department of the Tennessee Corporation, it was announced in Atlanta. He will be responsible for technical and business



Hargrove

studies in the plant food industry.

Prior to this assignment, Mr. Hargrove was with the agricultural chemicals division of Monsanto Chemical Company in St. Louis, and Lion Oil Company in El Dorado. For several years he was agronomist and field supervisor for the Texas Agricultural Experiment Station at McGregor.

## Best Fertilizers

Lowell W. Berry, president and board chairman of The Best Fertilizers Co. of Lathrop, California, has announced his resignation as Best's president. He will continue as chairman of the board.

Mr. Berry also announced that John M. "Red" Harris of Baltimore, Maryland, has been elected president, and R. Henry Wheless, also of Baltimore, vice president in charge of fertilizer production.

Since 1956, Mr. Harris has been assistant general manager, Davison Chemical division of W. R. Grace & Co., when he joined Davison Chemical in 1946.

Mr. Wheless is a mining engineer. Since 1957, he has been staff assistant to the general manager, Davison Chemical Division of W. R. Grace & Co.

## N. C. State

Two major personnel changes have been announced by the Agricultural Extension Service at North Carolina State College.

Extension director R. W. Shoffner announced that J. E. (Ed) Foil, 48-year-old Rockingham County agricultural agent, has been appointed to the district agent staff.

Director Shoffner also announced that Howard M. Singletary, a district agent since 1953, is retiring.

## IMC

Earl L. Butz, dean of agriculture at Purdue University and U. S. Assistant Secretary of Agriculture from 1954 to 1957, has been elected to the board of directors of International Minerals & Chemical Corporation.



Butz

Dr. Butz joined the faculty at Purdue in 1937 and was named head of the agricultural economics department in 1946. Eight years later he was appointed Assistant Secretary of Agriculture and served on the board of the Commodity Credit Corporation. In 1957 he returned to Purdue as dean of agriculture.

A nationally recognized authority in the field of agricultural economics, he has served on the research staffs of Brookings Institution, Washington, D. C., and the National Bureau of Economic Research, New York. He was chairman of the U.S. delegation to the United Nations Food & Agriculture Organization, Rome, in 1955 and 1956.

On the IMC board, Dr. Butz replaces Rawleigh Warner, retired.

## Freeport

Raymond H. Feierabend has been elected a vice president of Freeport Sulphur Company, it was announced by Robert C. Hills, president.

Mr. Feierabend will be responsible for the company's sulphur operations in Louisiana which include five mines currently producing at a rate in excess of 2,000,000 tons a year. Mr. Feierabend joined Freeport in 1942.

## Lummas

Gerald R. Lawrence, of Riverdale, N. Y., has been appointed chief engineer of the Newark office of The Lummas Company, W. M. Creasy, company vice president, has announced.

Vice president Creasy said that Mr. Lawrence took over the duties of H. M. Mitchell on November 1. Mr. Mitchell, who reached retirement age, will continue with Lummas as a consultant.

## TVA

TVA today announced the appointment, effective November 1, of



Williams

Dr. Gerald G. Williams as director of TVA's division of agricultural relations at Muscle Shoals, Alabama. He succeeds Dr. Leland G. Allbaugh, who retired at the end of October.

Dr. Allbaugh had headed the division for the past nine years.

In his new post, Dr. Williams is responsible to the manager of agricultural and chemical development for developing and administering plans and projects for the evaluation of new TVA fertilizers, their introduction to farmers, and their effective use throughout the United States. He also will recommend objectives and programs for activities related to the management and use of agricultural resources.

Prior to joining TVA last February as assistant director of the Division, Dr. Williams was soil scientist with the Agricultural Research Service. He had been in charge of the Southern Piedmont Experiment Station at Watkinsville, Georgia, since 1957.

## Ortho Division

Ortho Division, California Chemical Company has announced the appointment of three men in the field: Eldon S. Ratcliffe as field agronomist for the Illinois, Missouri and Kansas areas, and Thomas H. Schultz, district agronomist, Des Moines. Mr. Schultz was with Ortho from 1956 to 1958, and has meanwhile been working for his PhD. Both report to district manager R. C. Yapp. John A. Sauer, Jr., as sales representative for the Ohio area has been announced by W. J. Majure, Great Lakes district manager.

## Dempster

Arthur C. Nichols has been named general sales manager of Dempster Mill Manufacturing Company of Beatrice, Nebraska.



Nichols

He was formerly farm machinery division manager for Minneapolis-Moline, a division of Motec Industries, Inc., of Hopkins, Minn. He had been with Minneapolis-Moline for a per-

## —Industry People...

iod of 16 years.

Mr. Nichols brings to his management post at Dempster a broad experience in the farm equipment industry. He has held positions in service and engineering as well as in retail, product and export sales.

Earlier in his career, he owned and operated farm equipment dealerships.

### Bemis

A. L. Park, manager of Bemis Bro. Bag Company's paper specialty plants, has been appointed manager of the St. Louis bag plant and sales division, it was announced by C. W. Akin, executive vice president.



Park

In related new



Coyne



Heard

assignments, J. S. Heard, resident manager of Bemis' Crossett, Ark., paper specialty plant, has succeeded Mr. Park at the paper specialty plants' headquarters in St. Louis, and H. J. Coyne, field sales supervisor for the company's Houston sales division, has assumed Heard's vacated position at Crossett.

Mr. Park joined Bemis in 1949; Mr. Heard came to Bemis in 1949; Mr. Coyne started with Bemis in 1950.

### Owens-Illinois

The appointment of four key executives in the marketing department of the new Forest Products division of Owens-Illinois Glass Company was announced by Thomas W. Brown, Jr., division vice president. They are: James C. O'Neal, Jr., general sales manager for multiwall bags and paperboard. He was assistant general sales manager of the former multiwall bag division of O-I.

John R. Murphy, manager of product planning. Mr. Murphy has been general sales manager of the Owens-Illinois multiwall bag division, now a part of the Forest Products division.

Peter J. Fluge, manager of sales promotion and communications, with

responsibility for advertising, publicity, internal communications, and sales literature. Mr. Fluge was with Owens-Corning Fiberglas Corporation for 18 years before becoming vice president of a Chicago advertising agency in 1957. He joined O-I earlier this year.

William H. Morris, Perrysburg, manager of market development. He was vice president and manager of board sales for the former O-I Mill Division.

Three multiwall bag salesmen of the Forest Products Division of Owens-Illinois Glass Company have been assigned new sales territories:

Ronald D. Simmons, who has covered the Texas-Louisiana area out of Houston for the past two years, transfers to New York succeeding B. J. Ainsworth, who recently was named Eastern regional sales manager.

William E. Wehner, Jr., of Louisville, who has covered Kentucky, southern Ohio and Indiana since earlier this year, replaces Mr. Simmons in Houston.

Herman J. Roes, who recently completed his sales training, succeeds Mr. Wehner in Louisville.

### Royster

G. O. (Gerry) Powell, sales manager for F. S. Royster Guano Co., Madison, Wis., has been named assistant general sales manager for the Norfolk, Va., based fertilizer manufacturing firm.



Kahl



Powell

Mr. Powell took charge of Royster's Northern and Midwestern sales areas, November 1, from a Toledo, Ohio, headquarters. He succeeds George G. Miller, who died unexpectedly of a heart attack July 19.

In his new position, Mr. Powell is to supervise sales offices in Madison, Indianapolis, Toledo and Piqua, Ohio, Lyons, N. Y. and Reading, Pa. Royster operates factories in each of these cities, except Reading.

Raymond F. Kahl, who has been assistant sales manager, F. S. Royster Guano Co., Madison, Wis., since 1955, has been named sales manager at Madison to succeed Gerry Powell.

Mr. Kahl will direct an office staff,

an assistant sales manager and seven salesmen in a territory that covers all of Wisconsin, parts of Michigan, Minnesota, Iowa, and Illinois.

### Tuloma

Clare R. Wolf, of Chicago, has been named executive vice president and a director of Tuloma Gas Products Company, Tulsa, Oklahoma. President R. A. Carter has announced.

Before being named to this position, Mr. Wolf served with Tuloma's affiliate, Standard Oil Company (Indiana), as deputy coordinator of marketing on the staff of the vice president for marketing, supply and distribution.

As Tuloma's new executive vice president, Mr. Wolf will have over-all responsibility of the company's marketing activities of liquefied petroleum gas, natural gasoline, sulfur and the company's recently acquired line of nitrogen products.

### L. H. Butcher Co.

F. W. Pearson, vice president, L. H. Butcher Company, has announced the appointment of John W. Burden as manager of the Product Development department for L. H. Butcher Company, distributors of industrial chemicals throughout



Burden

the eleven Western states, Alaska and Hawaii.

After receiving his Master's Degree, Mr. Burden entered the employment of Standard Oil Company of California at the El Segundo refinery and remained with that company until October of 1951 at which time he resigned.

During his fourteen years with the Standard Oil Company, Mr. Burden served in a number of assignments as engineer in designs section, construction engineer, maintenance engineer, lead engineer in the designs section of the tank group, operating foreman and general foreman in the Light Oil division.

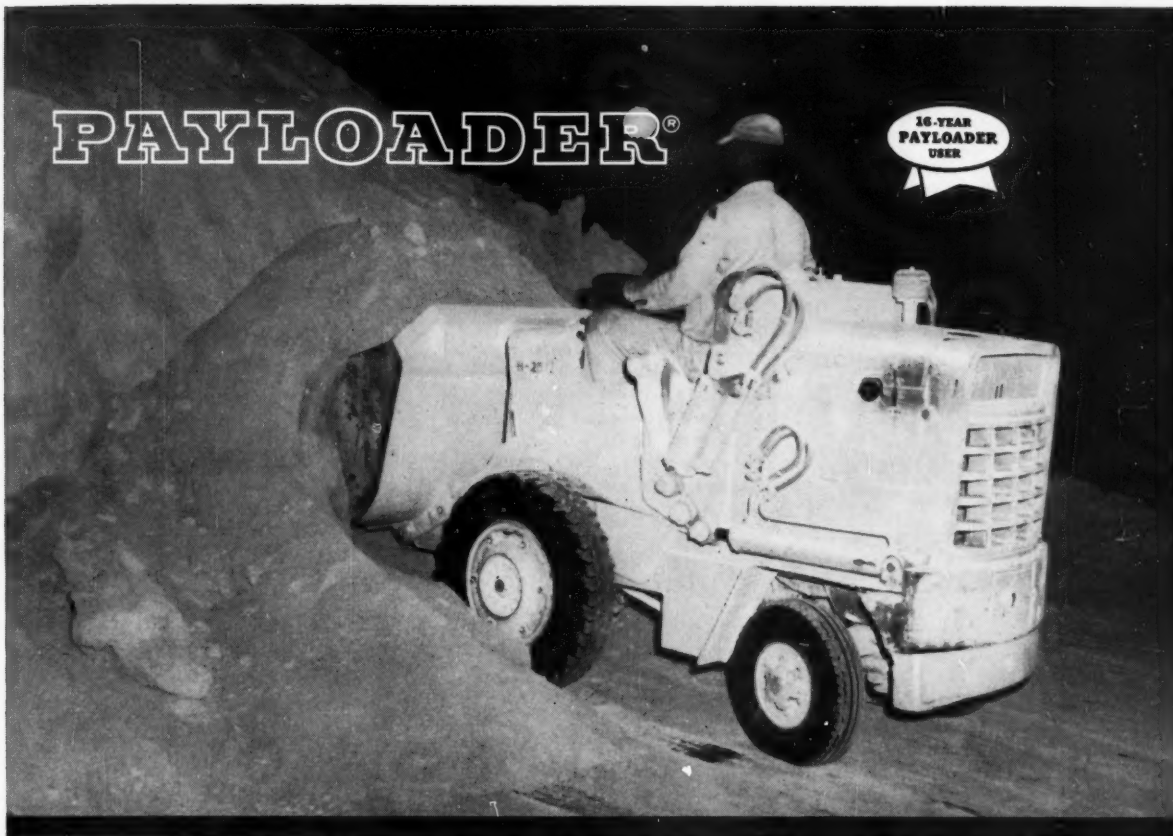
### Sylvania

The appointment of Christos C. Mpelkas to the newly-created position of plant physiologist for the Lighting Products division of Sylvania Electric Products, Inc., has been announced by Thomas H. Cashin, national marketing manager.

In his new capacity, Mr. Mpelkas will be responsible for studies in plant physiology and its relationship to lighting.

# PAYLOADER®

16-YEAR  
PAYLOADER  
USER



## "This is a real production loader"

For 73 Years the Wilmington Fertilizer Co. has produced chemical fertilizers to serve an agricultural area within a 125-mile radius of Wilmington, N. Car. As one of the area's leading producers, the company uses 9 PAYLOADER tractor-shovels to handle incoming materials from boxcars, and in mixing and bagging operations.

*"We have used PAYLOADER tractor-shovels since 1945," says Plant Supt. George Sloan, Jr. "The first replacement with a Model H-25 was made early in 1960. The second in spring, 1961. This is a real production loader—it's fast, has large load capacity and excellent maneuverability, especially in the close bin and alley areas. It has given us production increases up to 50% over the smaller loaders."*

Moving Materials to the Mixer on a 125-ft. haul, the Model H-25 with its 2,500-lb. operating capacity can average handling 50 tons an hour. Another H-25, working on a 100-ft. delivery haul, supplies a bagging

machine rated at 60 tons per hour. "Our PAYLOADER equipment," states Mr. Sloan, "gives us such advantages as proved dependability, long machine life and proved efficiency in handling materials."

Credit this Fine Production Performance to the H-25's superior basic design: it combines a 2,500-lb. operating capacity with power-shift transmission and matching torque converter, power-transfer differential, power steering and a short 6-ft. turning radius. The H-25 also is "extra protected" against costly downtime with special air and oil filters, self-adjusting hydraulic brakes, and special oil and grease seals on all vital pivot points.

Your Hough Distributor wants to show you what a "real production loader" like the H-25 or larger PAYLOADER model can do in handling your bulk materials. Ask him for a demonstration or return the coupon for additional information.

# HOUGH®



THE FRANK G. HOUGH CO.  
LIBERTYVILLE, ILLINOIS  
SUBSIDIARY - INTERNATIONAL HARVESTER COMPANY



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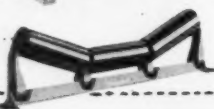




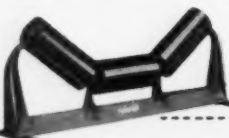
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## — of This and That . . . .

— "Huckster Frank Keenan" as his friends are calling him these days, is Dr. Frank Keenan, one of Du Pont's top research men. For the past several years, Frank has been deep in research on Du Pont's new anti-freeze "Telar" and this fall he has appeared on TV doing the commercials. Frank has many friends in the fertilizer industry.

— E. B. Henby, National Dust Collector Corp., Chicago, at the Round Table in Washington last month, had his pocket picked (in the hotel rest room) — someone bumped into him and took his billfold — EBH said it wasn't so much the loss of the money as loss of all the credit cards. And to make it worse, he didn't have the numbers on them to wire stop payment instructions. (Bet you haven't written down the numbers on yours, either).

— H. J. Koch has been invited to become a member of the Advisory Committee of the Council for Scientific and Industrial Research for development of research for industry in South Africa. Mr. Koch obtained his masters degree in chemistry with distinction at Rhodes University. He is a past president of the S. A. Chemical Institute and a life member of the Royal Society of South Africa. During the past thirty years, Mr. Koch has been closely associated with SA's chemical industry, having a particularly intimate knowledge of the fertilizer industry, and is well known in international fertilizer circles. Mr. Koch is the industrial advisor to Chemiese Nywerhede van Suid-Afrika Beperk, a wholly owned subsidiary of Federale Volksbeleggings.

— Edwin C. Aylward, president of Alyco Chemical, Sullivan, Ill., reports that on their recent check of 332 farms on which soil was tested, 294 of them bought liquid fertilizer. Also, their retail outlet sales have shown marked gains this year, accounting for 65 percent of the Alyco market, as compared with 35 percent represented by dealers, — 22 total retail outlets situated in 20 central Illinois counties — a gain of 14 over 1960, with a marked increase in soil testing conducted in a newly enlarged laboratory . . . Alyco's direct sales methods, service and incentives, including free hail and fire insurance are written up in a feature article appearing in the October 28 issue of Chemical Week.

— Communist China is granting exit permits to citizens who want to leave the country — in return for 15 tons of fertilizer from abroad. Hong Kong newspapers reported that so many Chinese had asked their relatives abroad to comply with the demand that the price has shot up in recent weeks . . . China's "freedom with fertilizer" program kills two birds with one stone — reduces population and increases food production.

— Packages of fertilizer have become an everyday item in the post office of Macao, Portuguese territory on the doorstep of Red China. Two-pound packages are sent daily by Macao residents to friends and relatives behind the Bamboo Curtain to help fight a serious food shortage. This according to an AP report.

— And speaking of birds (as we were a moment ago), the folks at West Coast Fertilizer Co., Belle Glade, Fla., entertained 90 guests last month at a pheasant shoot and Spanish style dinner. Of the 125 birds brought from the west and released, some two dozen escaped the shot.

— J. Delmas Hinson, of Smith-Douglass Company, Whiteville, N. C., has been named Sales Supervisor of the Year for the states of Virginia, North Carolina and South Carolina, according to vice president J. H. Culpepper, spokesman for the selections committee. As Sales Supervisor of the Year, Mr. Hinson and his wife, Frances, win a free vacation for seven days and deluxe air flight to and from any vacation spot of their choice in the United States. Also included in the prizes are a Kodak Automatic 35mm camera, 3 pieces of matched luggage, \$150.00 spending money, and a baby sitter while they're away.

— General Electric Company is operating a new laboratory in Burlington, Vt., devoted solely to developing ways to extract fresh water from the sea. The facility serves as G. E.'s engineering center for sea-water distillation work.

— Management personnel of The Standard Oil Company (Ohio) was introduced to many of the governmental, civic, business and educational leaders in the Joplin (Mo.) Tri-State area last month, by Atlas Chemical Industries board chairman and president, Ralph K. Gottshall, at a luncheon there. Solar Nitrogen Chemicals, Inc., owned equally by Standard and Atlas Chemical Industries, Inc., is completing a new \$15,000,000 ammonia-urea-solutions complex near Joplin, and Atlas is operating the plant for Solar. The new facility is located adjacent to the large explosives plant that Atlas has operated in this area for nearly half a century.



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# Association Activities

## MEETINGS

### DECEMBER

- 4 **Minnesota** Soils and Fertilizer Short Course, Koffee Hall, University of Minnesota, St. Paul
- 6-7 **Alabama** Winter Plant Food Conference, Whitley Hotel, Montgomery
- 7-8 **Michigan** Fertilizer Conference, Kellogg Center, E. Lansing
- 7-8 **Missouri** Fertilizer Conference, Student Union, Columbia
- 11 **Washington** Liquid Fertilizer Dealers Assn., annual meeting, Hotel Davenport, Spokane
- 12-13 **Indiana** Fertilizer Conference, Memorial Center, Lafayette
- 13-14 **Louisiana** annual Plant Food Conference, Capitol House, Baton Rouge
- 14-15 **Ohio** Fertilizer Conference, Student Union, Columbus
- 19-20 **Kansas** Fertilizer Conference, Umberger Hall, Manhattan
- 19 **N. Dakota** Fertilizer Conference, Student Union, Fargo

### JANUARY

- 4-5 **Arkansas** annual Fertilizer Conference, Marion Hotel, Little Rock
- 4-5 **Colorado** Fertilizer Conference, State University, Collins
- 5-6 **W. Colorado** Horticultural So-

ciety, Civic Auditorium, Grand Junction

- 9 **Iowa** Fertilizer Dealers Short Course, Student Union, Ames
- 9-10 **Texas** annual Fertilizer Conference, College Station
- 10 **Iowa** Fertilizer Industry Representatives Conference, Student Union, Ames
- 16-17 **Georgia** Plant Food Educational Society annual Conference, Athens
- 16-17 **Illinois** Fertilizer Conference, Urbana
- 16-17 **Nebraska** Fertilizer Conference, Lincoln
- 17 **New Mexico** Agricultural Chemicals Conference, State University, Las Cruces
- 18-19 **Southern** Farm Forum, Roosevelt Hotel, New Orleans
- 18-19 **New Mexico** Fruit & Vegetable Short Course, State University, Las Cruces
- 23-24 **S. Dakota** Fertilizer Conference, Brookings
- 25 **Montana** Plant Food Association, Spring Dealer Meeting, State College, Bozeman
- 29-31 **W. Oregon** Fertilizer Dealer Meeting, Corvallis
- 30-31 **Arizona** Fertilizer Conference, University of Arizona, Tucson
- 30-31 **North Carolina** Soil Science Society, Raleigh

## Fertilizer Manufacturing Problems Meet Set For Savannah January 11-12

The National Plant Food Institute's southern regional office in Atlanta has announced a conference on fertilizer manufacturing problems to be held at the DeSoto Hotel, Savannah, Ga., on January 11-12.

"This pilot conference will be open to all persons interested in production of mixed fertilizers," Dr. Robert L. Beacher, southern regional director of the Institute, states. A registration fee will be charged to cover a luncheon and publication of proceedings for the two-day conference.

Dr. Vincent Sauchelli, fertilizer technology consultant for the Institute, and Quentin Lee, plant food production director for Cotton Producers Association, Atlanta, will be in charge of the program which will include discussion sessions on: granulation and formulation, materials handling, caking control, corrosion,

maintenance, and others. Experienced discussion leaders will handle the topics with ample 'question and answer' sessions.

Reservations should be made directly with the DeSoto Hotel in Savannah.

### NPFI Committee Wants More Collaboration

The Chemical Control Committee of the National Plant Food Institute, has adopted a resolution requesting further participation, including collaboration on experimental work by public and private laboratories with the Association of Official Agricultural Chemists (AOAC). This move looks toward the development of more accurate fertilizer chemical analytical methods which will benefit farmers, industry and the control groups alike.

### Southern Ag Workers Meet in Jax Feb. 5-7

The 59th annual meeting of the Association of Southern Agricultural Workers will be held in Jacksonville, Florida, February 5-7, 1962. General Association headquarters will be at the George Washington Hotel and the Agronomy Section will meet in the Seminole Hotel.

Dr. Louis N. Wise, Dean of Agriculture at Mississippi State College, is president of the Agronomy Section. Other officers include the vice president and chairman of soils, Dr. Marlowe Thorne, Oklahoma State University; chairman of crops, Dr. Hugh W. Bennett, Mississippi State University; secretary, Dr. U. S. Jones, Agronomy Department, Clemson College, South Carolina.

The Association, which numbers nearly a thousand members, will meet in a variety of sections covering all major fields of agricultural sciences to review progress and discuss future needs in research, teaching, and extension activities contributing to the advancement of Southern agriculture.

### MCA to Feature Chemical Products Packaging

Twenty-two of the nation's leading authorities in the fields of transportation and packaging of chemicals will headline the 1962 Symposium on Packaging of Chemical Products to be held March 13-14, 1962 in St. Louis, Mo.

Approximately 500 packaging and distribution experts from the United States and Canada are expected to attend the meeting sponsored by the Manufacturing Chemists' Association, Inc.

### Fertilizer Talks Included in Chemical Engineers Meet

For the first time in its 54 year history the American Institute of Chemical Engineers has scheduled a precedent setting six day annual meeting.

In four days of technical sessions, at the Hotel Commodore, N.Y.C., December 2-7, 177 papers will be heard in forty technical symposia. A symposium titled Competition of the U. S. Chemical Industry in World Markets will analyze basic cost factors, communist competition, including that from China, and how we can improve our competitive position.

## Industry Meeting Calendar

DATE	EVENT	LOCATION	CITY
Jan.	10-12 Agricultural Ammonia Institute	Sheraton-Jefferson Hotel	St. Louis, Mo.
Feb.	15-16 Midwest Industry & Agronomists	Edgewater Beach Hotel	Chicago, Ill.
June	10-12 National Plant Food Institute	The Greenbrier	White Sul. Spgs., W. Va.
June	26-28 Pacific N.W. Fertilizer Conference		Walla Walla, Wash.
July	18-21 Southwest Fertilizer Conference	Galvez Hotel	Galveston, Texas
Oct.	11-12 Fertilizer Control Officials		Cincinnati, Ohio
Oct.	24-26 Fertilizer Industry 'Round Table'	Mayflower Hotel	Washington, D.C.
Nov.	5-7 National Fertilizer Solutions Assn.	Deauville Hotel	Miami Beach, Fla.

### Ammonia Institute Meets at St. Louis January 10-12

Agricultural ammonia sales representatives, equipment manufacturers and implement dealers, and farmer-users of ammonia will gather in St. Louis January 10-12 for the 11th Annual Agricultural Ammonia Institute Convention to be held at the Sheraton-Jefferson Hotel.

A feature of the three-day Convention will be the Trade Show, where ammonia distributors and equipment manufacturers will exhibit their wares.

On January 11 Dr. George C. Smith, pioneer student, promoter and authority on agricultural ammonia from the University of Missouri, will address the group.

Roswell Garst, nationally-recognized authority on nitrogen use from Coon Rapids, Iowa, will be the featured speaker at the final business session on January 12.

David H. Bradford, Jr. of Mid-South Chemical Corporation, is president of the Institute. Jack F. Criswell is executive vice-president.

### Belgian Superphosphate Producers Form Association

A new step towards community of approach to the problems of the phosphate industry was made by the formation of the Association Belge du Superphosphate.

Chief members of the new association are Union Chimique Belge; Metallurgique de Prayon; S. A. de Pont-Brule and Etablissements Kuhlmann.

The aim of the new association is to safeguard the trade interests of its members, both in Belgium and abroad through:

Mutual discussion of questions relating to the phosphate fertilizer industry and connected questions concerning the fertilizer trade in general;

Encouragement of research on fertilizer utilization, including propaganda for extended use of calcium superphosphate; and

Securing close cooperation among the associated interests in rationalizing production and distribution with a view to reducing periodic idleness of production units.



#### HIGHWAY BILLBOARDS PUSH SOIL TESTING

Arkansas' intensified soil fertility counties have added billboard advertising in their soil test promotion. The billboard space is frequently donated by local banks and interested commercial establishments, and the full-color sign is purchased from the Extension Service with local county funds. The signs are available to anyone at reproduction cost from the Arkansas Extension Service Soils Specialist, Box 391, Little Rock, Ark.

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# Round Table Studies Materials Handling Problems

The Fertilizer Industry Round Table held its eleventh annual meeting in Washington, D.C., November 8-10. Centered around the theme of 'Materials Handling', the technical and production conference attracted a record attendance of 434.

Round Table Chairman Vincent Sauchelli, chemical consultant to National Plant Food Institute, and Vice Chairmen Albert Spillman of Fertilizer Manufacturing Cooperative, and Joseph E. Reynolds of Davison Chemical Co. Division, W. R. Grace & Co., rotated at the moderator's post, while Secretary-Treasurer Housden L. Marshall of Olin Mathieson Chemical Corp., supervised registration.

W. B. McClelland, headquarters secretary of American Material Handling Society, keynoted the meeting at the opening session with a challenge to adapt accounting procedures to segregate overall costs of moving and storing materials from the costs incurred for only those specific operations which make the product more saleable. This would give management a better basis for making key decisions, he said, just as direct labor and direct material costs do today.

Stressing the need to take a fresh look at each problem, Mr. McClelland projected an integrated containerization pattern in which the farmer would be able to pick up his fertilizer at the plant in a removable truck body and haul the entire unit directly to the field for storage; the same universal body might then be used to haul the crop back to the market place.

Continuing the idea of advanced technology in handling of bulk solids, John Fischer of Sprout, Waldron & Co. described developments in pneumatic handling of materials which are accepted practice in other industries, but have not been adopted yet by fertilizer manufacturers.

R. M. Geisenheyner of Butler Manufacturing Co., pursued the topic still further in presenting new methods in transporting and unloading bulk solids.

The afternoon session began with a talk on the fundamentals of weighing by Arthur Sanders, secretary of

the Scale Manufacturers Assn. He stressed checkweighing materials receipts to avoid inventory shortages, and recommended checkweighing product output. The latter can be done on a routine spot check, but preferably a checkweigh of every bag or unit, with the checkweigher feeding back data for correction of the weighing-filling equipment. He reminded that on 25,000 tons a year of a product valued at \$60.00 per ton, a ½-lb. overweight on each 100-lb. bag can amount to \$7,500, while the same overweight on 50-lb. units can total a loss of \$15,000 annually.

The remainder of the afternoon session was given over to the study of liquid materials handling. A discussion group on anhydrous ammonia and solutions was led by Elmer Perrine of Allied Chemical Corp., Nitrogen Division. Other participants were Bill Lewis of du Pont, Ben Anderson of Sinclair Petrochemicals, and Walter Whitlock of Texaco Inc.

Mr. Lewis covered physical properties of solutions: specific gravity, salting-out temperature and vapor pressure, with emphasis on the latter subject. He outlined the essential elements of a well-designed transfer system and pointed out potential trouble spots in a typical system.

Mr. Anderson centered his attention on ammonia transfer systems, discussing the merits and disadvantages of a compressor system versus pump transfer. He described methods of determining when a solutions car is actually empty — citing the dangers of inaccurate metering resulting in incorrect formulation and higher transportation costs — and revealed that 2.4% of the cars returned to the Sinclair plant by mixers last year still had solution remaining in them. Of the cars shipped for direct application, he estimated the percentage of non-emptied cars would be greater.

Mr. Perrine presented some slides reflecting the variations in characteristics of solutions resulting from ammonia loss during unloading, and stressed the necessity — as did the other speakers — of keeping the pressure up all through the han-

dling system.

Mr. Whitlock offered advice on the preferred methods of unloading and handling various liquid materials. He said air pressure was the preferred method for handling high-vapor-pressure solutions, and pointed out precautions advisable if a pump is used in conjunction with the air. He recommended a pump for ammonia transfer, as introduction of air creates a rust problem in a steel or iron system. He also gave some tips on dealing with salted-out solutions in lines and cars.

Tom Martin of U.S. Industrial Chemicals Co., Division of National Distillers and Chemical Corp., described storage and handling procedures for phosphoric acid. He covered the relative merits of different types of tanks, lines and pumps. One pertinent point in his discussion of bonded-lining tanks for acid storage was the factory facilities for applying lining materials. Due to the expense of field erection and lining of larger storage units, he suggested consideration of more and smaller factory-fabricated tanks to provide the same storage capacity.

Frank Nielsson of International Minerals & Chemical Corp. spoke on storage, transfer and handling of sulfuric acid. He made specific recommendations, based on IMC experience, of pumps and piping materials for handling acid of various concentrations at various temperatures, and described preferred procedures for lubricating pump seal packing.

The second morning session began with a panel discussion on bags, bag handling and storage of bagged goods, led by F. Pocha of the Paper Shipping Sack Manufacturers Assn. Other participants were W. L. Shoemaker of International Paper Company's Bagpak Division, R. A. MacDonald of Bemis Bro. Bag Co., and J. H. Dively of St. Regis Paper Company's Bag Division.

Mr. Pocha initiated the forum and Messrs. Shoemaker and MacDonald followed with a description of bag construction features and a thoroughgoing review of packers. Mr. Dively spoke on palletizing and storing, illustrating with a color film of



the procedures used at two fertilizer plants.

Mr. Spillman, moderating the session, offered the comment that his experience has indicated that paying more for better quality bags actually saves money on his total packaging costs. In response to a question from the floor about polyethylene bags, Sam Shelby of Federal Chemical Co. Division of National Distillers & Chemical Corp., reported satisfactory results on their use of the material for packaging 50-lb. units of mixed fertilizers. He stated that they are using 5 mil poly bags, 26 inches long and 16 to 17 inches wide, heat sealed.

Final topic of the morning meeting was dust collection, handled by a two-man team.

Harry Hoon of Northern Blower Division, Buell Engineering Co., stressed the cost of dust in wear on equipment, especially motors, its adverse effect on comfort and safety, and the salvage value of the materials collected. In existing plants, he recommended testing air samples to determine the size and type of equipment needed. Locations where he suggested collection included crushers, elevators, conveyor transfer points, bagging or bulk loading

units, and screens. For screens he said the preferred procedure is to move 50 cu. ft. of air per minute for each square foot of screen area, pulling the air down through the screen. He urged careful attention to hood design to assure indraft velocity sufficient to capture the dust.

G. G. Schneider of Western Precipitation Division, Joy Manufacturing Co., centered his talk around various types of collectors, comparing their relative efficiency for different applications and particle sizes. He described and illustrated electrostatic precipitators, mechanical (cyclone) and bag-type collectors, and wet-type scrubbers.

At the business meeting, the Round Table executive committee (see second paragraph of this meeting report) was unanimously reelected to serve for two more years. The 1962 meeting dates were set for October 24-26 at the Mayflower Hotel in Washington, D.C., due to impossibility of arranging a suitable November date. Dr. Marshall announced, however, that dates for the first or second week in November had been secured from 1963 to 1970.

At the second afternoon session, A. B. Phillips of Tennessee Valley Authority's Division of Chemical De-

velopment reported on a recent survey of ammoniation practices in plants using the TVA-type continuous ammoniator. The plants ranged up to 11 years in age, averaging 4½ years. A graph of installation dates showed a fairly level profile from 1955 through 1960, with the most ammoniators (26) for a single year installed in 1956.

The top five grades being manufactured, he indicated, were: 5-20-20, 12-12-12, 10-10-10, 6-24-12 and 6-24-24. The top five ratios were: 1:4:4, 1:1:1, 1:2:2, 1:4:2 and 1:2:1. The most popular size for the ammoniator was 7 x 14 feet, and speeds range from 4 to 16 rpm. Eighty percent of the plants employ no separate granulator drum, and the typical plant uses 50 to 60% of the ammoniator length for ammoniation.

Mr. Phillips found that 60% use drilled pipes for introducing liquids into the dry bed of materials; 11% use a block-type sparger, and 9% use a slotted-lip sparger. The 42% using mild steel or black iron spargers reported an average of 2 weeks service. The 39% using Hastelloy-C reported 22 weeks average service, and the 15% using stainless steel were averaging 11 weeks service.

To control granulation on high-

#### ROUND TABLE SPEAKERS

1. Covering liquid materials handling were: Elmer Perrine, Allied Chemical Corp., Nitrogen Div.; Bill Lewis, Du Pont; Ben Anderson, Sinclair Petrochemicals; and Walter Whitlock, Texaco.

2. Acid storage and handling speakers were Tom Martin (left), U. S. Industrial Chemicals Co., Div. National Distillers & Chemical Corp.,

and Frank Nielsson (right), International Minerals & Chemical Corp.; at left center is Round Table Chairman Vincent Sauchelli, chemical consultant to National Plant Food Institute; at right center is Vice Chairman Joe Reynolds, Davison Chemical Co. Div., W. R. Grace & Co.

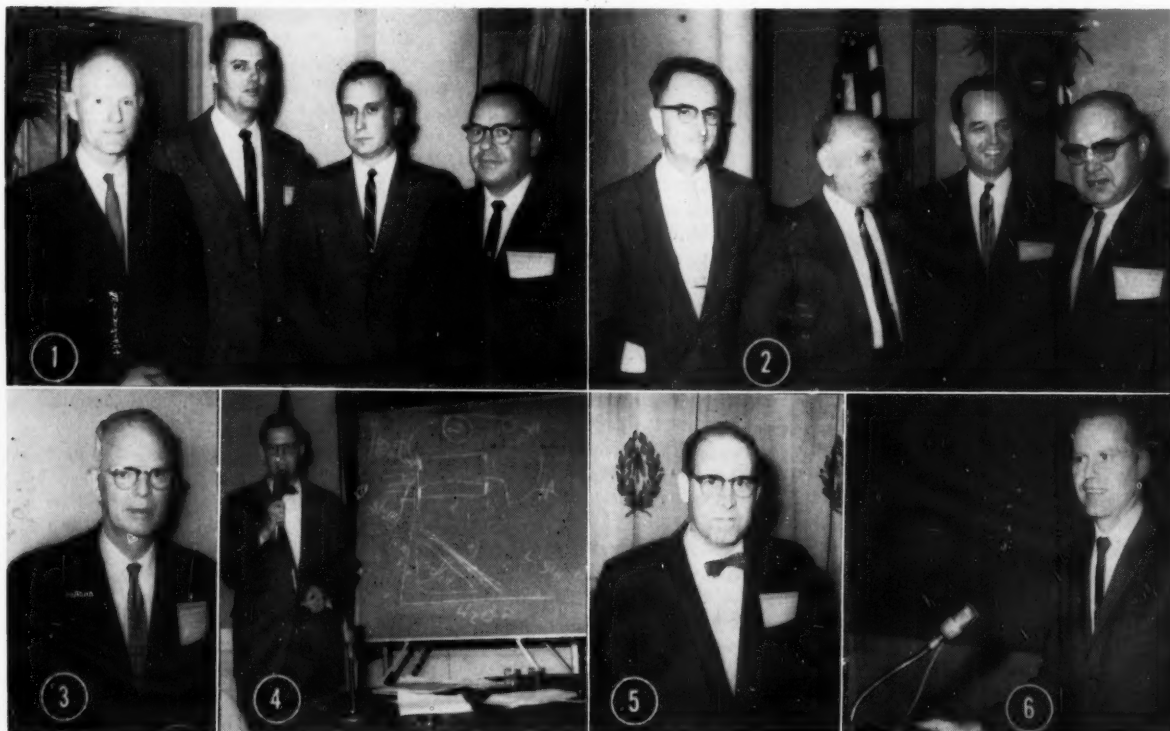
3. Reviewing conditioning agents in mixed fertilizers was John Hardesty, U.S. Department

of Agriculture.

4. Ben Smith, Chemical & Industrial Corp., spoke on the spheridizer process as applied to granulation.

5. Robert Wernet, Freeport Sulphur Co., described handling of liquid sulphur.

6. Al Phillips of Tennessee Valley Authority reviewed characteristics of plants using the TVA continuous ammoniator.



## —Round Table...

nitrogen grades, 61% limit the solution rate, 56% employ a high recycle rate, and 8% use air. To promote granulation on low-nitrogen grades, 78% use water, 74% reported the use of granular potash, 57% use excess acid, and 23% add steam. Twelve per cent of the plants use a preneutralizer, and half of them scrub the ammoniator stack.

Ten per cent of them have no dryer, Mr. Phillips reported, and the ones using a dryer employ co-current drying by a ratio of three to one. Eighteen per cent use a conditioner on the product, with most of these using 1% or less on 1:1:1 ratios and 1 to 2% on 1:4:4. As for screening, 30% size the product -6 +16, 10% -6 +20, 10% -7 +14, and 8% -6 +14.

In responding to the question of how they would change their ammoniator if they were starting over, Mr. Phillips said that 65% would make it longer, 5% would make it larger in diameter, 7% would make it both longer and larger, 15% would make no change, and 8% would use an entirely different type.

John O. Hardesty of U.S. Department of Agriculture summarized the practices of using conditioning agents in mixed fertilizers. He described the crystal-knitting bond in caking, and said the problem can be minimized by reducing the input of highly-soluble salts. Further improvement of the mechanical condition in the pile can be achieved by careful attention to cooling and drying of the product, and by accelerating completion of chemical reactions. He also cautioned against stacking easy-to-cake goods to a height that will exert too much pressure on the material.

Mr. Hardesty reviewed the characteristics of silicious, diatomaceous earth and clay conditioning agents, and related the effects of particle size, density and shape of both the fertilizer and the conditioner. He gave a formula for determining the amount of conditioner needed to coat fertilizer particles, involving the surface area of the fertilizer particles and the diameter of the conditioner particles. Illustrating, he calculated that a fertilizer product screened -8 +10 and coated with a conditioner 10 microns in diameter would require 2% of the coating agent. The finer the coating agent, the greater the efficiency, he said, and as the fertilizer particles get smaller the conditioner requirements go up.

Mr. Hardesty described one conditioning process in which calcium nitrate is prilled in a tower filled

with mineral oil. The product is centrifuged to remove excess oil, then bagged at  $\frac{1}{2}$  of 1% oil content. He also described recent work with amines and plastic materials as conditioners.

In conclusion Mr. Hardesty touched on pile and bag set problems with X-O-X grades. He advised use of controlling factors in production as far as possible, and said that there is not yet any economical means of preventing the caking tendency in these grades.

Following up on a panel that attracted much attention and comment at the 1960 Round Table, a panel this year brought back some of the participants for a 'progress report' on standardization and uniformity. The four panelists represented users, along with producers of the primary plant nutrients.

Jack Frederick of Sohio Chemical Co. spoke for the nitrogen producers, and described their efforts toward standardization. He reviewed the work of the committee on standardized nomenclature, and told how its work had simplified identification of nitrogen solutions through the coding system used by most manufacturers today. He described their continuing efforts toward standardization of analytical procedures in determining specific gravity, vapor pressure and salt-out temperature. The latter, he said, is the most troublesome point, as it is also called crystallization point, saturation point, and freezing point, and has yet no official name or method of determination.

Ed Carnell of Davison Chemical Co. Division, W. R. Grace & Co., represented the phosphate producers. Citing the handicap of working with a variable raw material, he pledged the industry's interest in developing uniformity as far as possible without pushing the cost of the product to unrealistic levels. He told of improvement in the preparation of producers data sheets, and outlined efforts to get the reports to specify fractions by screen sizes (10, 20, 35, 65 and 100), to give moisture content and method of determination, and to report free acid as  $H_3PO_4$ . While much remains to be done in achieving them, he conceded the producers consider these goals as good levels.

Speaking for the potash producers, Ed Kapusta of Potash Co. of America told how that group — with the help of an industry committee appointed by National Plant Food Institute — has moved toward its goals. While absolute standardization and uniformity is technically pos-

sible, it is not economically feasible, he pointed out, but big strides have been made by potash suppliers through adoption of the terms 'standard', 'coarse', and 'granular'. Further efforts are being made in reaching toward the users panel specifications of particle size ranges.

As for reports on individual shipments, he stated that data on chemical analysis and specifications usually arrive at the customer's plant before the car reaches the siding. In conclusion, Dr. Kapusta urged the industry not to insist upon such a high degree of standardization that it stifles progress and competition among suppliers.

Rodger C. Smith of Eastern States Farmers Exchange, who represented the users on the panel, agreed that definite progress has been made toward standardization and uniformity. He congratulated the industry on its rational approach to an involved, complex problem. He recognized especially the efforts of the potash producers, and noted some improvement in triple superphosphate with uniformity of chemical analysis being held to  $\pm\frac{1}{2}$  unit and a reduction in the number of fines in the product.

He stated that the users panel has continued to work toward determining their minimum needs as to particle size and specifications, and offered the following suggestions as to particle size, which he said were "considered to be reasonable and permit the ingredient manufacturer considerable latitude to cope with differences in raw materials or processes used." They are as follows:

**Standard:** not more than 10%, preferably none, on 10 mesh; not more than 20% through 65 mesh; not more than 10%, preferably none, through 100 mesh. **Coarse:** not more than 15%, preferably none, on 10 mesh; not more than 10%, preferably none, through 35 mesh. **Granular:** not more than 15%, preferably none, on 6 mesh; not more than 10%, preferably none, through 20 mesh. Screen meshes referred to are Tyler. Relatively normal distribution curve is assumed within the indicated limits of screen range.

Mr. Smith also called for continued efforts to improve the condition and uniformity of normal superphosphate and sulphate of ammonia.

Ben G. Smith of Chemical and Industrial Corp. described application of the spherodizer to granulation. Pre-dryer work led to development of the spherodizer, which produces better than commercial dryness, he related, and the unit is now used as

## —Round Table...

both pelletizer and dryer, since it operates on a principle of flash-drying a fresh layer of liquid phase on the surface of the pellet.

He described the unit as similar to the typical rotary dryer, but short in relation to its diameter. The reason for this design, he explained, is that it was determined that 80% of the heat exchange and drying took place in the first 10 feet of the unit, with a gas temperature reduction to 200° F., from 700° F. at input. High input temperature affords spray drying for new nucleii, he said, yet product exit temperature is only 160-170° F.

The spherodizer offers higher thermal efficiency, frequently by 50 to 100%, Mr. Smith concluded, has a low recycle rate of 1:1 (50%), delivers a highly uniform pellet, and is applicable for difficult materials.

Robert Wernet of Freeport Sulphur Co. spoke on handling liquid sulphur. As demand for this form of sulphur shipment has grown, terminals have sprung up in the vicinity of the consumer to the extent that field terminals now account for about twice as much capacity as storage at the shipping site, he said, predicting that soon 70% of domestic sulphur deliveries will be in liquid form. As a definite asset, he cited rapid unloading speed, with barges being emptied at the rate of 500 to 1000 tons an hour.

Truck deliveries in molten form can be made within a 100-mile radius of the terminal, Mr. Wernet said, and rail tanks are the only shipping media in which remelting time is incurred. Typical handling temperatures are in the 260-290° F. range, and since there is no moisture or water in the molten sulphur, he added, it is not acid in nature. Molten sulphur handling is safe and simple, he concluded, if proper precautions are observed.

The final session Friday morning began with Roy Benson of National Safety Council telling how to create and maintain interest in plant safety. He said a primary goal is to overcome the feeling by workers that safety has been rejected by management in favor of maximum production goals. It is up to supervision and management to evaluate a situation and decide how a job can be performed at minimum risk to the employees within a fixed set of conditions under which production must be carried forward. He outlined a step-by-step program of setting safety targets, indoctrinating and training personnel, and locating and correcting trouble spots. Mr. Benson lauded the fertilizer industry on its



### ROUND TABLE PANELS

Among the panel groups appearing on the Round Table program were—

**Top:** W. L. Shoemaker, International Paper Co.; F. Pocha, Paper Shipping Sack Manufacturers Assn.; R. A. MacDonald, Bemis Bro. Ray Co.; and J. H. Dively, St. Regis Paper Corp. This group handled the topics of construction, packing, palletizing and storing bags and bagged goods.

**Center:** Panel for progress report on standardi-

support of the regional supervisory training schools being conducted by its safety section and National Plant Food Institute.

Moderator Al Spillman, long a supporter of safety programs in the industry, strongly recommended membership in the Fertilizer Section, National Safety Council, to the audience in commenting on Mr. Benson's talk.

Finale on the program was a panel session on composition and use of new materials in fertilizer formulation, led by T. P. Hignett of Tennessee Valley Authority. Other panelists were George E. Smith of University of Missouri and Phil Stone of Virginia-Carolina Chemical Corp.

Mr. Hignett led off with a review of some of the newer materials. In diammonium phosphates he described the 18-46-0 and 16-48-0 impure

zation and uniformity consisted of (left to right) Roger C. Smith, Eastern States Farmers Exchange; Jack Frederick, Sohio Chemical Co.; Ed Carnell, Davison Chemical Co. Div.; W. R. Grace Co.; and Ed Kapusta, Potash Co. of America.

**Bottom:** Reviewing composition and use of new materials in fertilizer formulation were George E. Smith, University of Missouri; Phil Stone, Virginia-Carolina Chemical Corp.; and T. P. Hignett, Tennessee Valley Authority.

ammonium phosphates from wet-process acid and the 21-53-0 pure crystalline material from furnace-grade acid. He told of the higher-nitrogen ammonium phosphate-nitrate materials, 30-10-0, 20-20-0 and 20-10-0, and mentioned 34-17-0 and 29-14-0 as being in the experimental stage with no authoritative information yet available.

Speaking of bulk density factors in weights per cubic foot, he explained how the diammonium phosphate materials can reduce cost per unit of plant nutrient by 20 to 25¢ in bulk blends. Turning to use of diammonium phosphate in chemically processed granular mixed fertilizers, he cited the advantages that it is easier to ship than ammonia and phosphoric acid, and puts less water and heat into the processing reaction.



## —Round Table...

As for stability, particularly in regard to nitrogen loss, he stated that the compound is quite stable under any usual or reasonable process and storage conditions, especially when used in combination with ordinary superphosphate. In studies at TVA, Mr. Hignett added, there was no detectable nitrogen loss from the material within 90 days. Performance is satisfactory even in the presence of limestone, he said, provided it is dry.

Referring to reaction of diammonium phosphate with normal superphosphate, Mr. Hignett said no difficulty is encountered if the superphosphate is ammoniated before it can react with the DAP, citing tests in which the materials were on a belt together for one minute before ammoniation and there was no significant reaction, but when they were pre-mixed for several hours, reaction was considerable. He described laboratory studies indicating that there was only a 20% reaction after the materials had been mixed for 240 minutes, although the amount of diammonium phosphate present was sufficient to ammoniate the superphosphate at the rate of 7 pounds per unit of  $P_2O_5$ . There is very little reaction if the DAP is in granular form, Mr. Hignett specified, because prior to the reaction the diammonium phosphate absorbs moisture from the superphosphate, and the porosity of the granules delays reaction. On the other hand, he explained, crystalline DAP on absorbing the moisture enters a liquid phase on the surface of the particle and this accelerates the reaction.

Laboratory tests with superphosphate at various moisture contents showed at 4% moisture negligible reaction with diammonium phosphate, while at 9% moisture the reaction was more rapid but still quite small in 15 minutes. He described a bench-scale ammoniation test with a 10 x 20 inch ammoniator. Super and DAP were pre-mixed 15 to 30 minutes prior to ammoniation, which was at a rate of 5.8 to 6 pounds of ammonia per unit of  $P_2O_5$ .

Ammonia recovery was slightly better with diammonium phosphate than with muriate of potash. This could probably be explained by the difference in granulation, Mr. Hignett indicated, as granulation was better when no crystalline material was present.

Under ordinary conditions, he concluded that normal superphosphate ammoniates to about the same degree in the presence of DAP as without it. However, he cautioned, superphosphate used with diammon-

ium phosphate should be fully ammoniated to prevent pile reaction and granule disintegration.

Referring to use of 30-10-0 ammonium phosphate-nitrate in formulation of granular mixed goods, Mr. Hignett admitted the materials cost will run higher than acid and solution reacted in a preneutralizer, but said that if tonnages of these grades are small, the overall cost of formulating with 30-10-0 may be less expensive.

George E. Smith, chairman of the Soils Department of University of Missouri, evoked more questions and comment from the audience than any other speaker on the entire program with his talk on the growth of bulk blending.

Larger farms and older farmers (on the average) who want to contract out more functions have paced the increasing popularity of bulk blending in Missouri, he stated, where there are already 125 bulk blending plants and more under construction. Lower costs have been a factor, he indicated, but increased services have been the principal reason for the inroads these operations have made into the fertilizer market, to the extent that 20% of the available plant nutrients applied in his state today come from bulk dry blends.

Missouri law requires that samples for inspection and analysis be taken from the truck, Dr. Smith said, and in 1959 these samples were not meeting specifications, although the same load analyzed okay when sampled from the spout at the blending plant. He outlined tests which the University made in sampling blends first in cone-shaped containers, then in truck mock-ups and finally in actual trucks after 10-, 20-, and 30-mile hauls. He described studies of particle size, shape, and density as well as fan speed and spreading patterns.

From these studies, Dr. Smith stated it was determined that if the blender avoids piling the blended materials to a cone in the truck, segregation is minimized. While size, shape and density of the materials used are critical, he indicated that blenders this year failed to meet guarantees in only 19% of the samples, as compared with a 13% failure by fertilizer manufacturers. And, he added, some blenders will make a better record than many manufacturers, although both are required to meet the same tolerance on guarantees.

Altogether, he felt that use of materials in the -8 +20 screen size range — with good particle size dis-

tribution within the range — assuming compatible particle shapes and densities, can be blended in good equipment and suffer no significant segregation in hauling and spreading. If the operator knows the spreading characteristics of his truck and follows an arranged pattern, the application is rather consistent, he said, and — while there are sometimes streaks in the field — the yield will average out not significantly different from a perfectly-mixed and evenly-applied fertilizer.

In closing, Dr. Smith expressed the opinion that the industry has gone through a cycle from dry-mix to wet-mix to granulation and now back to dry-mix, and that bulk blending will continue its trend tow-

### Key to Pictures on Opposite Page→

1. Al Spillman, Fertilizer Mfg. Coop.; Fred McDonald and Paul Johnson, Pennsylvania Farm Bureau.
2. Jim Madigan, Fertilizer Engineering & Equipment Co.; Sam Gushin, Consumers Coop. Assn.; and Ernest Kontz, Davidson-Kennedy Co.
3. Bob Smith, Dave Conrad and Lou Cizek, Eastern States Farmers Exchange; J. W. Bratt, Allied Chemical Corp.; and Ted Bacon, Raymond Bag Co.
4. Jack Sturgess, Collier Carbon & Chemical Corp.; John Steedman, American Cyanamid Co.; and R. D. Young, Tennessee Valley Authority.
5. E. B. Henby, National Dust Collector Corp., and Arthur Hansen, American Agricultural Chemical Co.
6. John Stark, Chamberlin & Barclay; J. W. Furth, Allied Chemical Corp.; and C. D. Stevens, Lebanon Chemical Corp.
7. J. H. Dively, St. Regis Paper Corp., and Grayson Morris, Coop. Fertilizer Service of Richmond.
8. Elgin Doidge, Canadian Industries Ltd., and Walter Sackett Sr., A. J. Sackett & Sons Co.
9. Owen Niles, U.S. Phosphoric Products; Joe Markey, Tennessee Corp.; Barney Tatum, U.S. Phosphoric Products; and Paul Schallert, Tennessee Corp.
10. John Sadler, Davison Chemical Co. Div., and John Fletcher, U.S. Borax & Chemical Corp.
11. George Walton, Tennessee Corp.; Emerson Jones, Allied Chemical Corp., Nitrogen Div.; and P. D. Lanier, Tennessee Corp.
12. Syl Grant, Sohio Chemical Co.; Zenas Beers, National Plant Food Institute; Phil Stocker, Land O'Lakes Creameries; Bert Tucker, Sohio Chemical Co.; and G. A. Wicczorek, U.S.D.A.
13. Bob Day, Joseph L. Prosser Co., and John Rogers, Central Farmers Fertilizer Co.
14. Ed Kapusta, Potash Co. of America; Harvey O'Neill, Kingsbury & Co.; Clare Graft, Ketona Chemical Corp.; and Ed Kingsbury, Kingsbury & Co.
15. John Surber, Jay Marshall and Joe Bosman, Federal Chemical Co., and H. L. Marshall, Olin Mathieson Chemical Corp.
16. Harry Hoon of Northern Blower Div., Buell Engineering Co., and Gilbert C. Schneider of Western Precipitation Div., Joy Manufacturing Co., both of whom appeared on the program handling the topic of dust collection in the plant.
17. Tom Rogers, Allied Chemical Corp., Nitrogen Div., and Clarence Reichard and Gene Reichard of Robert A. Reichard, Inc.
18. W. F. Campbell, Haynes Stellite Co.; Frank Nielsson, International Minerals & Chemical Corp.; Allen Jackson, fertilizer Equipment Sales Corp.; and Al Henderson, Wilson & Toomer Fertilizer Co.
19. Jim Seaton, Pittsburgh Plate Glass Co.; Ted Nicholas and Alf Oines, Michiana Chemical Corp.
20. Sam Shelby, Federal Chemical Co., and Jim Turner, U.S. Borax & Chemical Corp.
21. Dean Gidney, Potash Co. of America; Mrs. and Mr. Charles O. Lawrence Jr., Chas. W. Priddy & Co.; and Elmer Perrine, Allied Chemical Corp., Nitrogen Div.
22. Mark German, Davison Chemical Co. Div.; Harold Blenkhorn, Brockville Chemicals Ltd.; and Franklin Wheeler, H. J. Baker & Bro.
23. George E. Smith, Potash Co. of America, and Phil Turner, Arrostock Federation of Farmers.

Commercial Fertilizer's  
Camera at the  
Round Table



## —Round Table...

ard capturing a sizeable part of the tonnage.

In response to questions, Dr. Smith said recommendations in Missouri are generally not less than 300 pounds an acre, but that trucks can be adjusted to spread with reasonable accuracy at rates as low as less than 200 pounds an acre. Answering another question, he cited studies with a 4-ton spreader truck filled with a blend and sampled at the plant, sampled again after a 30-mile haul, then once more after discharging half its load, and finally when only 1/20 of the load remained to be spread; variations in analysis were not significant, he said.

Returning to the topic of diammonium phosphate in mixed goods formulation, Phil Stone of Virginia-Carolina Chemical Corp. said use of this relatively new material permits considerably more flexibility in formulation of many goods. It has given the production man more choice in materials, but also has made the job of selection more difficult, he continued, and diammonium phosphate can be used to advantage at some locations not just to raise grade, but to reduce costs or improve product condition. In many cases, he pointed out, on grades such as 10-20-10, 12-12-12 or other high-nitrogen grades, DAP can reduce

the requirements of ammonium sulfate or triple superphosphate and allow the use of more normal superphosphate.

In ammoniation, V-C tries to use at least 100 pounds of diammonium phosphate per ton, he indicated, but careful attention is given to avoid reducing the amount of nitrogen solution to the point of such a low heat of reaction that it could result in poor granulation.

At the conclusion of this panel forum, the 1961 Round Table meeting was adjourned, setting a recent-years record for staying on schedule.

## —Around the Map...

(continued from page 27)

Sutlej River flood, has opened up again. The flood did serious damage to the main Indus Gas feeder which serves the plant. It was out of commission for exactly one month... September 6 to October 6.

### PERU

Corporacion de Reconstruccion y Fomento, Cuzco, has announced as successful bidder for financing, constructing and equipping their fer-

tilizer plant there, a group of German firms—Consorcio Uhde Ferros-taal Hochtiefbau.

### SWITZERLAND

U. S. Industrial Chemicals has opened at Baar a new laboratory designed primarily for polyethylene research service to the customers of USI.

### TURKEY

Gubre Fabrikalari TAO operator of the superphosphate facility at Yasi-moa, near Izmit, announces it is in operation, ready to turn out its projected 100,000 annual tons. The company operates another plant of the same capacity at Iskenderum.

### WEST GERMANY

Victor Chemische Werke are to have a plant at Castrop-Rauxel with a capacity of 60 tons  $P_2O_5$  equivalent. It is being built for them by Pintsch Bamag, Butzbach/Hessen. It will employ the Prayon process, and is being built under license from the Engineering and Industrial Corporation of Luxemburg.

### Industry Group Makes Tour of St. Regis Bag Plant in Virginia

Left: This group of fertilizer and chemical producers see how multiwall bags are wax clipped and dried for extra moisture pro-



tection during a recent tour of St. Regis Paper Company's big plant at Franklin, Va. The tour was designed to better acquaint these members of the fertilizer industry with all the processes that are involved in the manufacture of the multiwall bags they use to package their products. Left to right: P. C. Lewis, Bone Dry Fertilizer Co.; L. A. Krebs, The Baugh & Sons Co.; L. J. Sanford, St. Regis; J. T. Sadler, Davison Chemical Company; Paul Prosser, The Baugh & Sons Co.; and J. C. Baker, Summers Fertilizer Co., Inc.

Below: Members of the fertilizer industry who toured the plant. Left to right, seated: J. T. Sadler, Davison Chemical Co. Div., W. R. Grace & Co.; Ralph Bosher, Alliance Fertilizer Corp.; Elmer Hopper, Schludenberg-Kurdle Co.; Lutton Wilson, Reliance Fertilizer & Lime Corp.; W. R. Huck, St. Regis; and J. C. Baker, Summers Fertilizer Co., Inc. Standing: J. D. Helm, Jr., St. Regis; Paul Prosser, The Baugh & Sons Co.; R. E. Harrison, St. Regis; Ben Ottinger, Farmers Cotton Oil Co.; B. B. Lecompte, Bone Dry Fertilizer Co.; L. A. Krebs, The Baugh & Sons Co.; J. T. Walton, St. Regis; P. C. Lewis, Bone Dry Fertilizer Co.; T. F. Bridgers, Farmers Cotton Oil Co.; T. P. Barham, St. Regis; James Surace, manager, Franklin bag plant; B. W. Recknagel, vice president, St. Regis; and C. D. Fogg, Central Chemical Corp.





# TENNESSEE CORPORATION COPPER SULFATE



612-29 GRANT BUILDING, ATLANTA, GEORGIA



# Solutions Convention Looks at Additives and Side-Dressing, Considers Dealer Problems

631 registered to set new record  
as association meets in Chicago

An all-time record attendance marked the annual convention of National Fertilizer Solutions Association, held in Chicago October 30-November 1. Registrations climbed to 631 this year (up 140 from last year), and the unbounded enthusiasm that has characterized previous conventions of the seven-year-old association was still evident at meeting sessions and along the hotel corridors where 41 suppliers had exhibits and conference rooms.

Four new officers and five new directors were elected at the initial business session.

Edward O'Nan, owner of Land O'Nan Warehouse, Sturgis, Ky., was elected president; he had held the post of vice president and convention chairman this year.

John L. Strauss, vice president of Ris-Van Div., Armour Agricultural

Chemical Co., Belmond, Iowa, became the new NFSA vice president. Elected secretary was Thomas O. Cochrane, secretary and manager of Fert-L-Flow, Inc., Crookston, Minn. Rhoton Cross, assistant manager of Farmers Elevator Co., Oakville, Ind., was elected treasurer.

New directors elected included Dr. Strauss and Mr. Cochrane, along with: Clay M. Westcott, president of Holdrege Seed and Farm Supply Co., Holdrege, Neb.; Clarence A. Reichard, president of Robert A. Reichard, Inc., Allentown, Pa.; and L. E. Sullins, manager of Sullins Farm Supply, Littlefield, Texas. Retiring NFSA President Donald J. Humphrey, vice president of Flo-Lizer, Inc., Kingston, Ohio, also joined the board as a ex-officio member. There are 15 additional directors whose terms did not expire this year.

Presiding at the opening session was NFSA Director Bryce W. Strachan, secretary and general manager of Southland Liquid Fertilizer Co., Boynton Beach, Fla.

President Don Humphrey outlined the association's accomplishments during the past year. Foremost was establishment of NFSA's own office in Peoria, Ill., and employment of W. Harold Schelm as full-time executive secretary. He reported that the association now owns *Solutions* magazine outright, and has initiated a newsletter mailing to members. An agronomy committee has been selected, pointing toward the employment of a full-time staff agronomist.

Miami Beach has been selected as the site of the 1962 convention, he stated, headquartering at the luxurious new Deauville Hotel, located di-

rectly on the beach. He announced the dates as November 5-7, 1962, and said that the hotel guaranteed there would be no other convention there during that time. Special rates in effect for the convention (and for two days before and two or three days after) were quoted as \$9.00 to \$11.00 per person per day including breakfast (or brunch) and dinner, assuming two persons in a room. The \$11.00-per-person rooms face the ocean.

Appearing on the morning program to replace a speaker who had to cancel his engagement just before the convention was Dr. Kenneth McFarland, educational consultant to General Motors and to the American Trucking Association, frequently called the nation's number one speaker. He delivered an entertaining and inspirational message dealing with world problems, and narrowed his theme down to the convention level when he spoke of frustration as the biggest problem. He said it is urgent that each group—especially industry groups—must educate itself. He further narrowed the theme to the point that each individual company can excel only by out-serving its competitors.

Technical highlight of the session was a report on experimental work in salt-suspension fertilizers by A. V. Slack, chemical research supervisor in the Applied Research Branch of Tennessee Valley Authority's Division of Chemical Development. He stated that only a half-dozen liquid fertilizer producers are making and selling salt-suspensions in substantial quantities.

Mr. Slack reported that 40% of all liquid fertilizer mixers are using some wet-process phosphoric acid in

## NEW SOLUTIONS OFFICERS

New NFSA officers elected at the convention (left to right)—Treasurer: Rhoton Cross, Farmers Elevator Co., Oakville, Ind.; Vice President: Dr. John L. Strauss, Ris-Van Div., Armour Agricultural Chemical Co., Belmond, Iowa; Executive Secretary: W. Harold Schelm, NFSA, Peoria, Ill.; President: Edward O'Nan, Land-O-Nan Warehouse, Sturgis, Ky.; Secretary: Thomas O. Cochrane, Fert-L-Flow, Inc., Crookston, Minn.



their product, and that 20% are using it as the major source of  $P_2O_5$ .

Citing advantages to the suspensions, he pointed out that: higher grades are feasible, such as 12-12-12, 14-14-14 and 16-16-16; it allows the use of trace elements; it simplifies cold blending by eliminating the solution ceiling on potash salts.

However, Mr. Slack admitted there are some relatively minor disadvantages to be subtracted from the benefits. He enumerated them as: cost of the suspending agent, complication of plant operation, possible plugging of some nozzles, need for agitation before use, and erosion of equipment.

The afternoon was given over to visitation of suppliers conference room exhibits. A new plan this year spurred members to make a complete tour of exhibitors. At registration, each delegate received a sheet divided off in squares like a checkerboard, with suppliers conference room numbers in the upper corner of each square; upon visiting each room, the exhibitor stamped his number in the proper square. After the squares were all filled, the delegate dropped his sheet into a box from which five prize winners were drawn at the annual banquet.

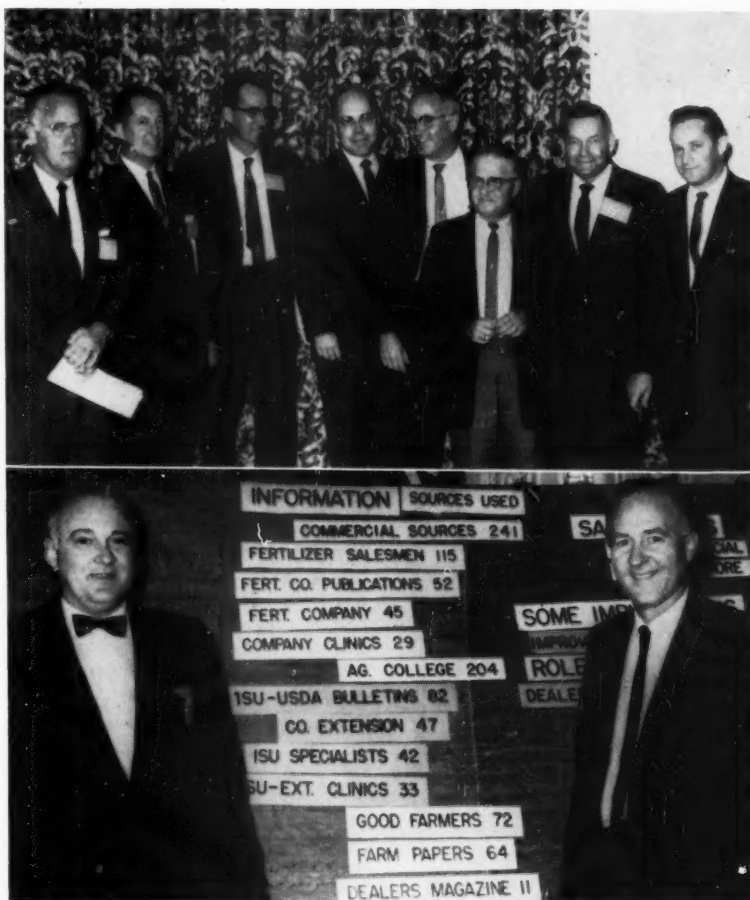
After a 'Dutch-treat' cocktail hour and dinner that evening, a get-acquainted hour and floor show drew a capacity crowd.

At the session the following morning, Director John P. Dail, Jr., of Rex, Inc., Huntsville, Ala., presided. Featured was a double panel on additives and side dressing, moderated by John L. Strauss.

Herb Day of Stauffer Chemical Co. covered insecticides. Earl C. Spurrier of Monsanto Chemical Co. talked on pesticides. Ellery L. Knake of University of Illinois had the herbicides topic. And Clark Sumner of A. R. Maas Chemical Div., Stauffer Chemical Co., spoke on trace elements.

Four fertilizer mixing plant executives contributed their thoughts and experience to the side dressing subject: L. T. 'Stoney' Stone of Goodpasture Grain & Milling Co., Brownfield, Texas; Jim Merriman of Merriman Fertilizers, Monticello, Ill.; George Lippincott of Dorchester Fertilizer Co., Cambridge, Md.; and W. A. 'Red' Senesac, Senesac Fertilizers, Inc., Fowler, Ind.

Most of the discussion centered around pre-emergence and post-emergence control of grass weeds in corn rows. Dr. Knake pointed out that tests had shown giant foxtail to reduce corn yields 25% and soybean yields 30%.



#### SOLUTIONS PROGRAM PARTICIPANTS

**Top**—Panel forum on additives to fertilizer solutions and side dressing was composed of (left to right): George P. Lippincott, Dorchester Fertilizer Co., Cambridge, Mo.; John L. Strauss (moderator), Ris-Van Div., Armour Agricultural Chemical Co., Belmond, Iowa; Ellery L. Knake, University of Illinois; Herb Day, Stauffer Chemical Co.; Clark Sumner, A. R. Maas Chemical Div., Stauffer Chemical Co.; L. T. Stone, Goodpasture Grain & Milling Co., Brownfield, Texas; Jim Merriman, Merriman Fertilizers, Monticello, Ill.; and W. A. Senesac, Senesac Fertilizers, Fowler, Ind.

**Bottom**—Joe M. Bohlen and George M. Beal, rural sociology professors from Iowa State University, presented findings of their study-in-depth of fertilizer dealers in their state.

Dr. Day said that pre-emergence herbicides offer a challenge to the fertilizer mixer to develop an educational program for dealers and farmers. Dr. Spurrier added that weed control must be included in the fertilizer and planting program planning, and that the farmer must have help in scheduling this program. It was brought out that the weed problem should be examined at the same time the soil sample is taken.

Post-emergence control was discussed, and the consensus of opinion seemed to be that flame control was the only practical alternative to cultivation for the present. Dr. Strauss reported one fall application of 2, 4 D in 14-7-7 liquid which killed the bottom three leaves of the corn plants along with the weeds, but apparently did not damage yield, as the farmer reported a 12 bushel increase on the treated plot.

Turning to insecticides, one panelist cited experience indicating that band application of insecticides (as with starter fertilizers) was not too effective, since it was too far from the seed. He recommended broadcasting, or placing the insecticide in the row with the seed. However, Dr. Strauss reported excellent experience with aldrin and heptachlor applied with liquid starter fertilizer for control of corn rootworm, provided the placement is banded one inch from the seed instead of two inches.

Considering the problems of mixing pesticides into liquid fertilizers, the panel recommended a pre-mix test before mixing the materials together in a tank, to avoid a 'gook' or 'gunk' precipitation due to incompatibility. Mixers were cautioned to watch the liquid fertilizer temperature — and to cool it to under 150° F. — when mixing in aldrin, diel-



## —Solutions Convention...



### SOLUTIONS ASSOCIATION AWARDS

**Top:** Archie V. Slack (left), chemical research supervisor in the Applied Research Branch at Tennessee Valley Authority's Division of Chemical Development, received a special award from NFSA for his contributions to the development of liquid fertilizer technology. Ernie Harper of Ayco Chemical Corp. made the award.

**Center:** Wayne R. Johnson (right) of Johnson Brothers Mills, Shenandoah, Iowa, was recipient of the association's 'Man of the Year' citation for his efforts since inception of NSFA. Dick Cecil of Cecil Fertilizers, Sorgho, Ky., presented the plaque. In the right foreground is Mrs. Don Humphrey of Kingston, Ohio.

**Bottom:** A new NFSA award this year was the plaque presented to retiring President Don Humphrey (right) of Flo-Lizer, Inc., Kingston, Ohio, presented by Director Bob West of Tryco Manufacturing Co., Decatur, Ill.

drin or endrin. They were also warned to avoid using acid-form 2, 4 D in a solution which has a high degree of free ammonia content; ester-form 2,4 D was recommended for solutions of this type.

Generally it was considered that separate application of herbicides was better where practicable, and broadcast application of pre-emergence herbicides was recommended so that rainfall can carry the material into the top one or two inches of soil to catch germinating seeds.

The panel concluded that herbicides will become progressively more selective, that systemic insecticides and fungicides will come forward at a rapid rate, and that in a generation or sooner cultivation may be entirely unnecessary.

Discussing trace elements, Dr. Sumner stated that in calcareous soils, tests often show an ample supply of a trace element, yet deficiency symptoms are evident in the crops. Often a specific treatment creates an evidence of deficiency of a different element, he said, and he described applications of iron, zinc and manganese together on some trials.

California law requires a minimum of 1/10 of 1% guarantee as metal in metal sulfates, Dr. Sumner continued, but there has been some effort to get the state to lower the requirements where elements are furnished in chelate form, because there is some evidence that this concentration approaches the toxic range for some chelated elements.

Foliar application came into the discussion, and a study was cited where 1% urea foliar-applied on citrus had increased uptake of iron and depressed uptake of zinc. Dr. Strauss told of applying 'shotgun' trace elements of trace elements in pesticides to truck crops.

As the conversation turned to side dressing, the fertilizer mixers assumed a more prominent part. Mr. Stone said that in his area a decent cotton crop just can't be made without side dressing, as pre-plant plus side-dress applications yield a half-bushel an acre more than pre-plant application alone. Another participant stated that splitting some crops' nitrogen requirements into two or three applications increased uptake efficiency by 15 to 25%.

Mr. Senesac said there is a growing trend among his two- and three-year customers to apply no plow-down or pre-plant fertilizer, but to put on the entire application as side-inches height.

Another panelist described a situation where a phosphorous deficiency was evident on 36 inch-high corn, and the crop was side-dressed with high-phosphate mixed fertilizer. Phosphorus uptake was found within 10 to 14 days, and a significant yield increase was measured for the side-dressed plots (50 lbs. N, 75-80 lbs.  $P_2O_5$  per acre) when compared with plots which did not receive the side-dressing. Still another panelist told of applying nitrogen to corn just before tasseling; with a good rain, the yield was increased 13 bu./acre, and without rain only 2 bu./acre.

Mr. Lippincott outlined a program of applying high-phosphate starter to corn, then side dressing with 75 lbs. of N per acre; yields showed a consistent increase of 20 to 22 bu./acre and ran over 50 bu./acre

increase on one field. Side dressing is applied as soon as the corn comes through the ground. On truck crops, he told how late nitrogen applied in irrigation water greens-up sweet corn and late urea applied the same way greens-up spinach, upgrading the crops' market prices substantially.

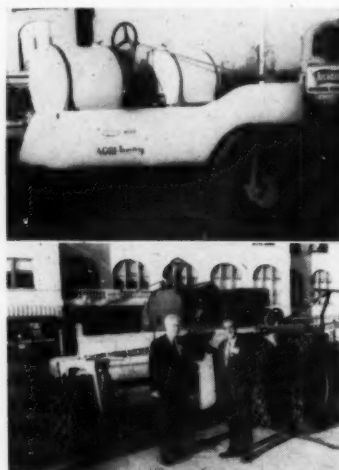
He also told of the success Dorchester Fertilizer has had in selling a three-step fertilization program which includes herbicide and insecticide applications.

A recess followed the panel session, then Herbert G. True spoke on the psychological and creative factors in sales and sales management.

NFSA Director Garvin C. Matthieson of Allied Chemical's Nitrogen Division presided at the afternoon session. The Role of the Dealer in Fertilizer Sales was the topic of George M. Beal and Joe M. Bohlen, professors of rural sociology at Iowa State University, who treated the audience to a fast-paced summary of findings from their study-in-depth of the fertilizer dealer in Iowa and his role in the marketing of fertilizers. (See COMMERCIAL FERTILIZER's November issue for the ninth in their special series of articles detailing their findings and conclusions.)

Most of the dealers in the study failed to realize the sales potential which fertilizer offers, Drs. Bohlen and Beal stated, although optimal

Exhibits moved outdoors this year in the case of these two units which were too large to bring into the convention hotel, and were displayed in the parking lot adjacent to the hotel. Both are high-flotation units designed to apply liquid fertilizer under wet-field conditions such as those encountered this spring. Shown at the top is Agricultural Business Company's 'Agri-Buoy' applicator featuring 'swamp buggy' pneumatic tires on the rear. Shown below is C and S Manufacturing Corporation's 'Spra-Mobile' low-compaction applicator, equipped with Tokheim metering unit; pictured in front of the equipment are C. F. Branting, Allied Chemical Corp., Nitrogen Div., and Lloyd Reid, Senesac Soil Service, Fowler, Ind.



## Solutions Convention...

use of fertilizers by Iowa farmers would triple the volume of fertilizers sold. The average fertilizer use was found to be only \$300 per farm, and 23% of farms don't use fertilizer at all, yet fertilizer represents the highest yield per dollar of farm input in the state.

Using a pair of large flannelboards for visual presentation of the findings, the researchers pointed out that the farmer expects far more of the dealer — in terms of services and advice — than the dealer feels he should provide, in general. The average dealer's fertilizer department for the study (which covered 8% of the state's 1800 dealers) produced 14.5% of the total store volume, and the average mark-up on fertilizer was 9.3% as compared with 14.4% on the remainder of the items. Only 9% of the dealers rated fertilizers as their main product, but these dealers sold 14% of the fertilizer. Only 26% of the dealers accounted for 73% of the fertilizer sold, and they averaged eight times the fertilizer sales of the remaining dealers.

Similarly, 26% of the dealers saw fertilizer as a good money-maker in itself (these, not surprisingly, had the highest mark-ups), while 31% considered it an important customer service (these had lower mark-ups), another 26% saw it as just another service (these had still lower mark-ups), and 15% considered it not a money-maker but needed it to compete (these had the lowest mark-ups).

The 26% of the dealers who sold 73% of the fertilizers had these other characteristics in common: offered a progressive 'service package'; were more progressive regarding new merchandising programs and technology; had greater fertilizer knowledge; saw their role as consultants; offered more services; and fewer of them offered credit.

Turning to the fertilizer information sources used by dealers, Drs. Beal and Bohlen found that commercial sources ranked at the top of the list, a reassuring fact to the industry after the poor showing these sources made in some earlier studies of farmer attitudes and information sources. Top preference among commercial information sources was the fertilizer salesman, followed by company publications, the company itself, and company clinics.

Next most frequently mentioned information source for dealers was the state agricultural college, followed by good farmers, farm papers, then dealer publications.

However, 50% of the dealers re-

ported they received no help from the manufacturer or distributor of fertilizers, although 75% of the sales and merchandising ideas came from commercial sources, and 75% of the dealers wanted more information of this type.

The survey turned up one especially troublesome spot at dealerships: in general the bookkeeping systems are poor, and family businesses and partnerships were the worst offenders on this score. Most dealers lumped fertilizer sales in with many other items, so that they actually did not know how much income they had from fertilizer. The researchers had to use gross profit figures for fertilizer, since the majority of dealers kept books so poorly that net profit could not be determined.

Drawing implications from their findings, Drs. Bohlen and Beal called upon the industry to help upgrade the dealer's management abil-

ity, to stress the role of services to the point that the dealer realizes he is selling not just a product but a service, and to help boost the dealer's image of the fertilizer potential.

This concluded the final business session, and conference rooms were again opened until the 'Dutch treat' cocktail hour that preceded the annual banquet.

President Don Humphrey presided at the banquet, where three honors were awarded (see pictures on page 50). Frank W. Lovejoy, Socony Mobil Oil executive and a past president of the Sales Executives' Club of New York, was the featured speaker. His theme was that markets are minds, and that marketing is communication, and he concluded that the prospect's interpretation of these communications must receive foremost attention.

On this note, NFSA's 'biggest meeting yet' was concluded.

1. Norman Godden, Flo-Lizer, Kingston, Ohio, and Garvin C. Matthiesen, Allied Chemical Corp., Nitrogen Div., New York.
2. Walter S. Colvin, Allied Chemical Corp., Nitrogen Div., and Loren Hopwood, Indian Point Farm Supply, Athens, Ill.
3. Jack Criswell, Agricultural Ammonia Institute, Memphis, and Jim Browne, Canada Packers Fertilizer Div., Chatham, Ont.
4. Mike Bazilli, Lely Ltd., Burlington, Ont., and Archie Slack, TVA, Wilson Dam, Ala.
5. Ted Neeley, Potash Co. of America, Peoria, Ill.; Bob Peine, Peine Grain Co., Minier, Ill.; and Harry Melton, Tri-County Liquid Fertilizer Co., Eldorado, Ill.
6. Dave Rowan, R. K. Disser and P. W. Williamson, Tokheim Corp., Ft. Wayne, Ind.
7. Harry Allen, Allerton Supply Co., Allerton, Ill., and Chuck Trunkey, U.S. Industrial Chemicals Co., Chicago.
8. Ed Kapusta, Potash Co. of America, New York, and Louis E. Frank, Midwest Plant Food, Napoleon, Ohio.
9. Bob Kays, Prior Products Co., Miami; Eddie Crouse, C-D Chemical Co., Liberty, Ind.; and Dave Mueller, Prior Products Co., Dallas.

**EDITOR'S NOTE:** Our apologies to our many friends at the NFSA meeting whose pictures we were unable to make. We were plagued with camera trouble throughout the convention; one day the flash attachment failed to operate, and the next day the camera itself wouldn't work.



## Fertilizer Safety Section Reports

# YEAR of PROGRESS

### at National Safety Council Annual Convention

Highlights of the industry's Safety Section show real progress . . . Membership increased to 105 companies comprising 300 plants . . . Five successful safety schools were held in different areas of the country, attendance reported as the best to date . . . The Section's Executive Committee met 3 times during the year, voted to increase the number of members in the committee (safety work is growing in the industry so a larger committee is required; 5 new members were added) . . . Fertilizer Safety Contest rules will be published right after the first of the year . . . The industry's "Safety Guide" was finally completed and is available . . . The Fertilizer Safety Section has worked out a 5 year plan.

On October 16 and 17 at the Pick-Congress Hotel, Chicago, the Fertilizer Section of the National Safety Council held a two-day meeting during the annual meeting of the National Safety Council.

As at fertilizer safety schools held elsewhere over the country, emphasis at the meeting was on the necessity for adequate instruction in accident prevention work and the need to convince top management of the effect of safety work on the profit and loss statement.

General Chairman A. I. Raney, Safety Director, Phillips Chemical Co., Bartlesville, Oklahoma, presided at the opening session.

Speaking on "Accident Prevention Through Instruction," L. K. Jonas,

Chief, Supervisory Development Division, Texas Engineering Extension Service, Texas A. & M., College Station, Texas, pointed out that effective instruction is the key to safe practices; that many safety problems are related to communications within the plant, and that emergencies often might be avoided by effective communication. NPFT's Bill Ritnour assisted Mr. Jonas in demonstrating the "Communitimeter," a gadget which can be manipulated successfully only as a result of accurate communication between instructor and operator. As Bill puts it: "This demonstration indicated: (1) that words mean different things to different people, (2) that it is all but impossible for an instructor to convey a picture or concept so that

the operator will perceive the same image that the instructor had in mind; (3) that the instructor has no way of knowing exactly what "picture" he conveys without adequate "feedback"; (4) that the mind avoids detail; (5) that because a concept is clear to the instructor, often he assumes that the operator understands; (6) that most people will resort to trial and error in preference to reading written instruction; (7) that people with only a hazy concept of what they would like to communicate often attempt to impart their ideas to others."

Supervisors who issue instructions, often don't make them clear. As Alice in Wonderland put it: "When I use a word it means just exactly what I choose it to mean."

Members of the Executive Committee of the Fertilizer Section of the National Safety Council, which met in Chicago, October 16-17, shown are: Seated, left to right, C. S. Griffith, superintendent, Virginia-Carolina Chemical Corp., Cincinnati, Ohio; John S. Mark, manager Fertilizer Manufacturing Div., Farm Bureau Cooperative Assoc., Inc., Columbus, Ohio; Gaither T. Newnam, director of Industrial Relations, Insurance and Safety, Smith-Douglass Co., Inc., Norfolk; Marshall E. Petersen, National Safety Council, Chicago. Second row, left to right, Gene Harlan, Personnel Dept., Indiana Farm Bureau Cooperative Assoc., Inc., Indianapolis; James W. Smith, production superintendent, Western Phosphates, Inc., Salt Lake City; John E. Smith, safety director, Spencer Chemical Co., Pittsburg, Kansas; W. A. Stone, general supervisor, Production and Safety, Wilson & Toomer Fertilizer Co., Jacksonville, Fla.; R. L. Freeman, supervisor, Safety & Maintenance, Hooker Chemical Co., Houston. Back row, left to right: E. O. Burroughs, Jr., manager, Insurance Dept., F. S. Royster

Guano Co., Norfolk; W. C. Creel, safety director, State of North Carolina, Dept. of Labor, Raleigh; R. D. Chamberlin, safety supervisor, Cooperative Farm Chemicals Assoc., Lawrence, Kansas; Ray Engel, Schrock Bros. Co., Congerville, Ill.; R. S. Brown, safety director, J. R. Simplot Co., Minerals & Chemical Div., Pocatello, Idaho; Elmer C. Perrine, director of technical service, Nitrogen Div., Allied Chemical Corp., New York, and chairman, Nominating Committee; E. M. Jones, midwest technical service manager, Nitrogen Division, Allied Chemical Corp., Indianapolis; C. E. Alkire, superintendent, W. R. Grace & Co., New Albany, Ind.; Quentin S. Lee, director, Plant Food Production, The Cotton Producers Assoc., Atlanta; George F. Dietz, safety director, Fertilizer Manufacturing Cooperative, Baltimore; A. I. Raney, safety director, Phillips Chemical Co., Bartlesville, Okla.; A. B. Pettit, William R. Bradley & Associates, Newark, N. J.; M. C. Ellison, protection supervisor, Mississippi Chemical Corp., Yazoo City; William S. Ritnour, treasurer, National Plant Food Institute, Washington.





The following were elected officers of the Fertilizer Section for 1961-62: General Chairman, Gaither T. Newnam, Director of Industrial Relations Insurance and Safety, Smith-Douglas Co., Inc., Norfolk, Virginia; Vice-Chairman, John S. Mark, Manager, Fertilizer Manufacturing Division, Farm Bureau Cooperative Association, Inc., Columbus, Ohio, and Secretary, C. S. Griffith, Superintendent, Virginia-Carolina Chemical Corp., Cincinnati, Ohio.

Elmer C. Perrine, Director of Technical Service, Nitrogen Division, Allied Chemical Corporation, New York, was Chairman of the Nominating Committee.

"I'd rather see a lesson Than hear one any day." Verbal communication is extremely difficult to put over.

Do you say what you mean? Remember, the operator doesn't see the problem the way you see it. And, no one will ever admit he doesn't understand what you tell him.

Do you mean what you say? It isn't easy — in a language that has 73 meanings for the word "round" and 500 words in it with 15,000 meanings.

A paper, "Hernia and Strains in the Fertilizer Industry" by Dr. Joseph M. Bosworth, Division Medical Director, Liberty Mutual Insurance Company, Atlanta, was presented by Dr. John A. Palese of the same company. He pointed to the vast loss in work days due to hernia and said that some people by heredity were predisposed to hernia. He advocated thorough physical examinations for prospective employees and fitting new employees to the jobs, giving light physical work to those who have hernia predispositions. He further indicated that a thorough examination of work records should be made for each employee to determine if he has a history of back trouble and suggested X-ray of spinal columns where there is doubt. In other words, spend the money to find out the score rather than wait to correct after the damage is done. The highest cost at the beginning is the cheapest in the end. In case an employee develops back injuries or strain on the job, he said a prompt investigation and disposition of the claim should be made. Guide to proper lifting:

1. Never try to lift beyond your strength.
2. Always crouch down to what you are going to lift.
3. Get a good footing, placing feet eight to twelve inches apart.
4. Get a firm grip with fingers underneath the load whenever possible.
5. Keep your arms straight and keep your back in as nearly a straight up-and-down position as possible.
6. Lift gradually — avoid jerky motions.
7. Avoid twisting motions by shifting position



Gaither T. Newnam (center), director of Industrial Relations, Insurance and Safety, Smith-Douglas Co., Inc., Norfolk, Va., was elected General Chairman of the Fertilizer Section, National Safety Council. He is shown with the newly elected vice-chairman and program chairman of the Section, John S. Mark (left), manager, Fertilizer Manufacturing Division, Farm Bureau Cooperative Association, Inc., Columbus, Ohio, and C. S. Griffith, Superintendent, Virginia-Carolina Chemical Corp., Cincinnati, Ohio, newly elected Secretary.

of feet. 8. Lift by standing up or by pushing up with the strong leg muscles. This takes the strain off the back muscles. 9. Put things down by generally reversing the above methods. 10. Learn the trick or knack.

"Most back injuries either get better or worse, rarely are static." —Dr. John A. Palese.

Dr. Palese said that each supervisor should train his employees in lifting techniques with timely follow-up so their work habits will be right.

The second day's session, with the newly elected General Chairman, Gaither T. Newnam, presiding, was opened with a luncheon at which J. S. Queener, Manager, Safety and Fire Protection Division, Employee Relations Department, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware discussed, "Why You Should Have an Off-the-Job Safety Program." Mr. Queener pointed out that other than from a

"Profits are harder to make — a good safety program can improve the profit picture." . . . "Everyone should develop a subconscious safety attitude so that habit will help to look after you." —J. S. Queener.

humanitarian view, an off-the-job safety program is needed to lower industry costs, both direct and indirect. He said that promotion of off-the-job safety involves the entire family and results in greater safety consciousness at home and on the job; that the public believes that industry has a responsibility in this area as well as in other community welfare projects. Off-the-job safety helps industry to be a good community neighbor and also helps reduce the cost of operation.

A discussion of "Management's Role in Accident Prevention" by C.

"Confidence comes from competence which assures success. Spectacular accomplishment comes from many small accomplishments." —C. E. Alexander.

E. Alexander, Director of Public Relations, Illinois Farm Supply Co., Bloomington, Illinois, followed. He suggested that "safety men" take a serious look at themselves—whether they are a part of the problem or part of the answer. Next he suggested a look at the job to keep abreast of changes. Summarizing, he said that safety people represent a most important activity and that they must learn to be good salesmen to sell safety to top management and to convince them of the relation of safety to profits.

Continuing the meeting, T. A. Bayley, Plant Superintendent, American Agricultural Chemical Company, Cleveland, Ohio, spoke on "How to Eliminate the Risk of Overhangs in Fertilizer Piles." Mr. Bayley gave as cause of overhangs: 1. Inefficient blasting; 2. Cracks or fractures in the pile; 3. Material lumps of indeterminable size left on face; 4. Under cutting; and 5. Construction of buildings.

As a partial solution, he suggested—

T. A. Bayley's American Agricultural Chemical Company plant in Cleveland has over one million man hours without an accident; the plant averages 100 men throughout the year and 150 during peak season. They have the support of top management and the men themselves are for their safety program.

ed "shooting the pile" from the top, more effective drilling practices, mechanical devices to break up lumps, and improved bulkhead construction. He said that as soon as the pile became hazardous indicating danger of falling, it is time to do something—don't wait. Recognize the danger, report it and remove the hazard, he said.



1. Ansel I. Raney, Phillips Chemical Co., Bartlesville, Okla.; Grayson Morris, Cooperative Fertilizer Service of Richmond, Richmond, Va.; George Dietz, Fertilizer Manufacturing Cooperative, Baltimore, Md.; 2. Quentin Lee, Cotton Producers Association, Atlanta; Bill Ritnour, National Plant Food Institute, Washington; E. M. Jones, Allied Chemical Corp., Indianapolis; 3. Ray Engel, Schrock Fertilizer Service, Congerville, Ill.; Carl Alkire, W. R. Grace, New Albany, Ind.; James W. Smith, Western Phosphates, Salt Lake City.

4. Bill Stone, Wilson & Toomer Fertilizer Co., Jacksonville, Fla.; Robert Freeman, Hooker Chemical Co., Houston; R. D. Chamberlin, Cooperative Farm Chemicals Ass'n., Lawrence, Kansas; 5. Elmer Perrine, Allied Chemical Corp., New York; A. B. Pettit, Wm. R. Bradley & Associates, Newark, N.J.; E. O. Burroughs F. S. Royster Guano Co., Norfolk; 7. Marshall Peterson, National Safety Council, Chicago; C. S. Griffith, Virginia-Carolina Chemical Co., Cincinnati; Mike Ellison, Mississippi Chemical Corp., Yazoo City, Miss.

"How to Use the 'Serious Injury Index' as a Measurement of an Accident Prevention Program" was the subject of O. C. Haier, Manager, Safety and Workmen's Compensation, The Standard Oil Co. (Ohio), Cleveland. Mr. Haier felt that disabling injuries alone is not the proper tool to measure an accident prevention program. He suggested that more attention be paid to injuries necessitating first aid to non-disabling injuries as a key to a safety program and as a way to aid in avoiding more serious disabling accidents. He emphasized the development of safety consciousness. Variations of injuries within limits of control enable a company to reset its sights on preventing injuries, he said.

An "Electrical and Fire Demonstration—The Chemistry of Fire and Static Electricity" was presented by

About fire . . . A single tree can produce 1 million matches; 1 match can destroy a million trees. —A. E. Carter.

A. E. Carter, Fire Marshal, E. I. du Pont de Nemours & Co., Inc., Kinston, N.C. Mr. Carter told the group that to have fire there must be a combination of fuel, air and heat and that when any of the three is taken away, the fire will be extinguished. He demonstrated that combustible materials, either solid or liquid, must be vaporized before they will burn. He stressed the importance of understanding the characteristics of the fuel. His demonstrations emphasized the danger of static electricity. He cited cases of fire and explosions it has caused. All safety people need to pay more attention to this area of safety, he said. Summarizing, he said, safety is knowing the hazards and taking proper precautions against them.

On Monday prior to the official opening of the Fertilizer Section

meetings, the National Plant Food Institute was host at a luncheon for members of the Executive Committee. The Institute was represented by William S. Ritnour, Treasurer.

Wednesday morning, October 18 was devoted to a meeting of the Executive Committee of the Fertilizer Section. Members of the Executive Committee are as follows:

General Chairman—Gaither T. Newnam, Director of Industrial Relations, Insurance and Safety, Smith-Douglass Company, Inc., Norfolk, Virginia; Vice-Chairman and Program Chairman—John S. Mark, Manager, Fertilizer Manufacturing Division, Farm Bureau Coop. Association, Inc., Columbus, Ohio; Secretary—C. S. Griffith, Superintendent, Virginia Carolina Chemical Corp., St. Bernard Station, Cincinnati 17, Ohio; Newsletter Editor—George F. Dietz, Safety Director, Fertilizer Manufacturing Cooperative, 1800 South Clinton Street, Baltimore 24, Maryland; Assistant Newsletter Editor—Elmer C. Perrine, Director of Technical Service, Nitrogen Division—Allied Chemical Corp., 40 Rector Street, New York 6, New York; National Plant Food Institute—Liaison and Public Relations Committee Chairman—William S. Ritnour, Treasurer, National Plant Food Institute, 1700 K. Street, N.W., Washington 6, D.C.; Engineering Committee Chairman—E. M. Jones, Midwest Product Manager, Nitrogen Division, Allied Chemical Corporation, 6060 College Avenue, Indianapolis 20, Indiana; Membership Committee Chairman, also Nominating Committee Chairman—A. I. Raney, Safety Director, Phillips Chemical Company, Bartlesville, Oklahoma; Statistics & Contest Committee Chairman—W. A. Stone, General Supervisor, Production & Safety, Wilson & Toomer Fertilizer Co., Jacksonville, Florida; Insurance and Legislative Committee Chairman—E. O. Burroughs, Jr., Manager, Insurance Department, F. S. Royster Guano Company, P. O. Box 1940, Norfolk, Virginia; Research Committee Chairman—John E. Smith, Safety Director, Spencer Chemical Company, Pittsburg, Kansas; Supervisory Training Committee Chairman—W. C. Creel, Safety Director, State of North Carolina, Department of Labor, Raleigh, North Carolina; Off-The-Job Safety Chairman—James W. Smith, Production Superintendent, Western Phosphates, Inc., P. O. Box 893, Salt Lake City 10, Utah; Staff Representative—Marshall E. Peterson, National Safety Council, 425 North Michigan Avenue, Chicago 11, Illinois; Members-At-Large—F. A. Gerard, Manager of Safety, Olin Mathieson Chemical Corp., 745 Fifth Avenue, New York 22, New York; C. E. Alkire, Superintendent, W. R. Grace & Company, Davison Chemical Division, P. O. Box 358, New Albany, Indiana; M. C. Ellison, Protection Supervisor, Mississippi Chemical Corporation, Yazoo City, Mississippi; E. J. Largent, Industrial Hygienist, Reynolds Metals Company, Richmond 18, Virginia; G. B. Morris, Manager, Production & Construction, Cooperative Fertilizer Service, Inc., P. O. Box 1656, Richmond 13, Virginia; J. L. Shopen, Safety Director, Consumers Cooperative Association, P. O. Box 7305, Kansas City 16, Missouri; Quentin S. Lee, Director, Plant Food Production, The Cotton Producers Association, P. O. Box 2210, Atlanta 1, Georgia; Foster Rinefort, Safety Director,

Plant Food Division, International Minerals and Chemical Corp., 5401 Old Orchard Road, Skokie, Illinois; D. W. Flagler, Superintendent of Maintenance, Florida Phosphate Division, W. R. Grace and Company, P. O. Box 471, Bartow, Florida; A. B. Pettit, William R. Bradley and Associates, 18 Green Street, Newark 2, New Jersey; Ray Engel, Schrock Bros. Co., Congerville, Illinois; Larry Riley, Safety Director, O. M. Scott & Sons, Marysville, Ohio; R. D. Chamberlin, Safety Supervisor, Cooperative Farm Chemicals Assoc., P. O. Box 80, Lawrence, Kansas; G. M. Douglas, Industrial Relations, Swift & Company, Phosphate Center, P. O. Box 208, Bartow, Florida; J. C. Reeves, Production Manager, Robertson Chemical Corporation, Wainwright Building, Bute & Duke Streets, Norfolk, Virginia; A. C. Palmer, Plant Superintendent, Planters Fertilizer & Phosphate Company, P. O. Box 4857, Charleston Heights, South Carolina; J. C. Ink, Supervisor, The Consolidated Mining & Smelting Company of Canada, Ltd., Trail, B. C., Canada; R. S. Brown, Safety Director, J. R. Simplot Company, Minerals & Chemical Division, P. O. Box 912, Pocatello, Idaho; Gene Harlan, Personnel Department, Indiana Farm Bureau Cooperative Ass'n., Inc., 47 South Pennsylvania Street, Indianapolis 9, Indiana; R. L. Freeman, Supervisor, Safety and Maintenance, Hooker Chemical Corporation, Phosphorus Division, P. O. Box 9878, Houston 15, Texas; Charles Franklin, Technical Representative, International Minerals and Chemical Corp., 300 Fall Creek Parkway, Indianapolis, Indiana.

## NE Regional Safety School

The Northeastern Regional School on Accident Prevention in fertilizer plants will be held on December 7 and 8, 1961 at the New York State School of Industrial and Labor Relations, Room 525—The French Building, 551 Fifth Avenue, New York City. This school is one of 5 being held during 1961. It is under the sponsorship of the National Plant Food Institute and the Fertilizer Section of the National Safety Council.

W. C. Creel of the North Carolina Department of Labor is chairman of the supervisory training project; Elmer Perrine of Allied Chemical Corporation, New York City, is director of the school; and Harlan B. Perrins of the New York State School of Industrial and Labor Relations is the chief instructor.

An outstanding program with top flight men as instructors has been arranged.

# New 1100 TPD Concentrated Complete Fertilizer Granulation Plant

*Designed by*  
**DORR-OLIVER**  
*for Imperial Chemical  
Industries Limited*

The more than 40-year-old experience of the Dorr-Oliver organization in designing or equipping nearly 50 fertilizer projects in 17 countries has been utilized in another spectacular development—the largest C.C.F. granulation plant in the British Commonwealth and one of the largest in the world.

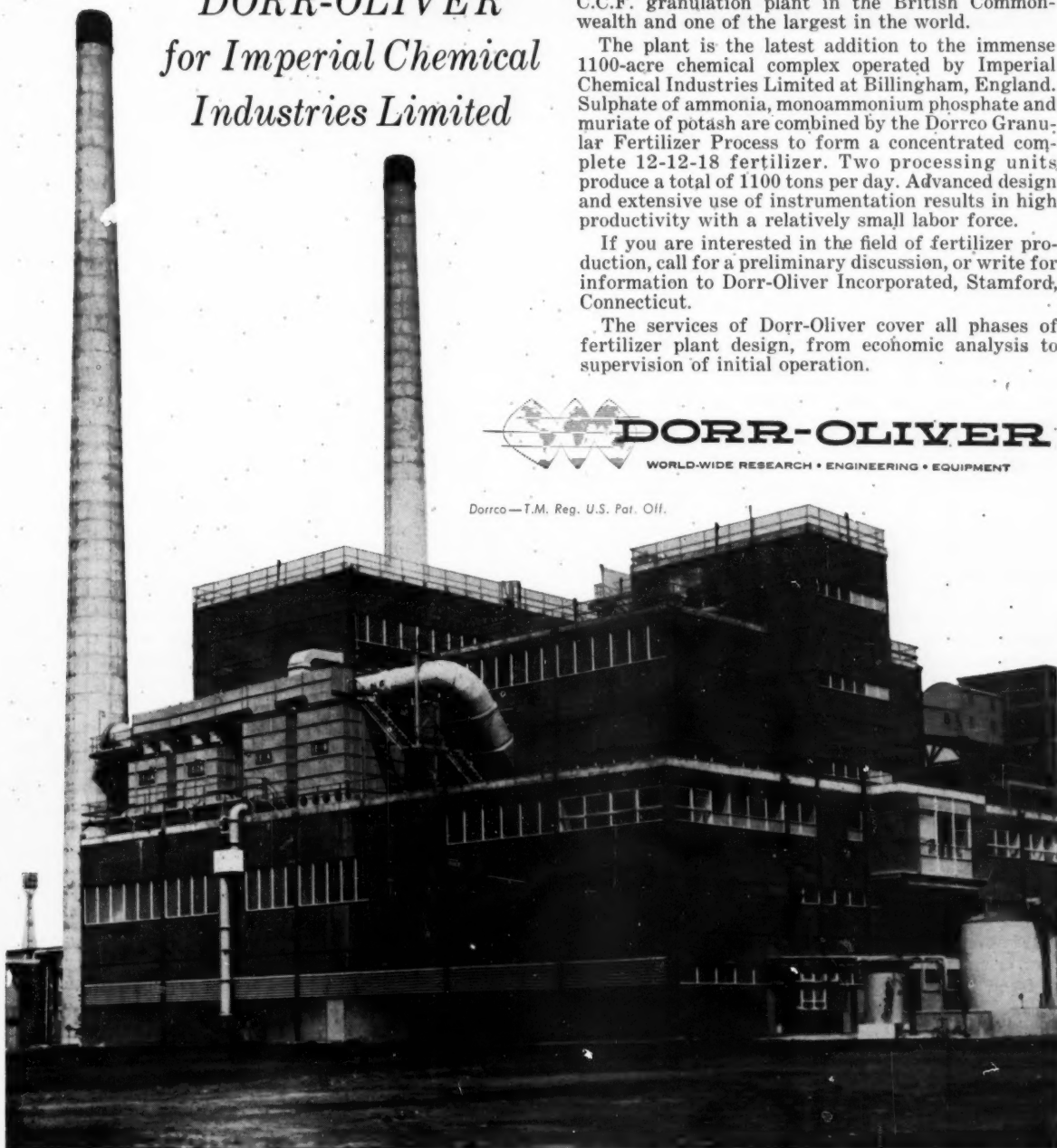
The plant is the latest addition to the immense 1100-acre chemical complex operated by Imperial Chemical Industries Limited at Billingham, England. Sulphate of ammonia, monoammonium phosphate and muriate of potash are combined by the Dorrco Granular Fertilizer Process to form a concentrated complete 12-12-18 fertilizer. Two processing units produce a total of 1100 tons per day. Advanced design and extensive use of instrumentation results in high productivity with a relatively small labor force.

If you are interested in the field of fertilizer production, call for a preliminary discussion, or write for information to Dorr-Oliver Incorporated, Stamford, Connecticut.

The services of Dorr-Oliver cover all phases of fertilizer plant design, from economic analysis to supervision of initial operation.



Dorrco—T.M. Reg. U.S. Pat. Off.







1. New officers elected for 1962: president, J. W. Kuzmeski, Amherst, Massachusetts; vice president, Harry J. Fisher, New Haven, Connecticut; secretary-treasurer, Bruce Cloaninger, Clemson, South Carolina.

2. Gordon Cunningham, Tennessee Corporation, Atlanta, Georgia; Dr. W. H. Garman, National Plant Food Institute, Washington, D.C.; AAFCO president C. V. Marshall, Ottawa, Canada.

3. C. V. Marshall, retiring president, receives plaque presented him by his good friend, Henry A. Davis, for the Association in recognition of his services.

4. Dr. R. C. Edwards, president, Clemson College, Clemson, South Carolina; Dr. F. W. Quackenbush, Purdue University, Lafayette, Indiana; Dr. S. F. Thornton, Royster Guano Company, Norfolk, Virginia; Carl W. Carlson, USDA, Beltsville, Maryland.

## Fertilizer Control Officials Meeting

The fifteenth annual convention of the Association of American Fertilizer Control Officials was held October 26 at the Woodner Hotel, Washington, D.C. Total registered attendance was 176 including: 83 representatives of the fertilizer industry, 71 control officials, 17 from USDA, 3 representatives from NPFI, and 2 members of the press. Last year total attendance was 165; fertilizer industry attendance 60.

On the evening of October 25th, the National Plant Food Institute hosted a buffet dinner which preceded the states relations committee session always held by the control officials the evening prior to the day of their meeting.

Maurice B. Rowe, chairman, States Relations Committee, Richmond, Virginia, presided at the evening meeting and introduced the following subjects for discussion:

1. How much detail should be presented in quarterly or annual publications on results of analyses by state control officials?

2. Is grade labeling legislation for Specialty Fertilizer in the public interest?

3. What policy should the control official follow in sampling and analyzing the numerous specialty fertilizers now offered for non-farm use? What is the answer to assessing penalties on small quantities? What is the trend in package size?

4. The Quinolum method for phosphate determination — pros and cons?

5. What can be done to correct the expression "available phosphoric acid" as now used in fertilizer guarantees? Does the move to change

guarantees for phosphate and potash to elemental basis offer opportunity to correct or improve terminology?

In his opening address president C. V. Marshall, Ottawa, Canada, stressed the cooperation that exists between the fertilizer industry and the control officials in their work toward a unified program to increase farm income, and reviewed some of the aims and accomplishments of the control group.

Dr. Robert C. Edwards, president, Clemson College, Clemson, S.C., in his talk on the Land Grant Colleges and American Agriculture, spoke of the signing of the Morrill Act, which is the foundation of Land-Grant education in this nation. As a result of this legislation, 50 states plus Puerto Rico have developed 68 fine colleges and universities which today represent the largest segment of American higher education at the undergraduate and graduate level. He expressed concern about the general lack of knowledge that exists throughout America today as to the importance of quality education at all levels and said that the lack of knowledge about the Land-Grant colleges and state universities, and the many fine programs being administered by them — which directly benefit all our people — is even more astounding.

Dr. Edwards presented the film "This is Clemson" which was produced to point up the importance of agricultural teaching, research, and extension, along with the other public service activities, to the success of agriculture.

"Fertilizers and Our Changing Agriculture" was title of the talk given

by Dr. W. H. Garman, National Plant Food Institute. Dr. Garman said that everybody today knows that in recent years the U. S. farmer has been in a drastic cost-price squeeze, which is likely to continue in the 1960s. The alternative, he said, will be to produce farm products more and more efficiently and our agricultural institutions will provide the farmer with the technology necessary to do this.

According to Dr. Garman, for each dollar the farmer used in buying a ton of fertilizer in 1910-14, he spent \$1.02 in 1935-39 \$1.43 in 1947-49; and \$1.53 in June of this year. These figures make it clearly evident that the price the farmer paid for fertilizer advanced less than the price he received for his products. But this is only part of the story as in 1910-14, the average plant nutrient content of all fertilizer bought by the farmer was approximately 15.0 per cent. For the period 1935-39 it averaged approximately 18.8 per cent; during 1947-49 it averaged approximately 22.4 per cent, and for the fertilizer year 1958-59 it was 29.3 per cent. This means that for each one per cent of plant nutrients a farmer purchased in his fertilizer during 1910-14, he purchased 1.25 as much in 1935-39, 1.49 times as much in 1947-49, and 1.96 times as much in 1958-59.

In spite of promised curtailed production, Dr. Garman continued, as a result of government programs, the picture for plant food use looks bright. And he anticipates a steady rise in plant nutrient use during the 1960s — this based upon USDA estimates combined with his own

estimates of increased rate of plant food use per acre. Dr. Garman is confident that farmers will continue their upward trend in plant food use per acre because there is no other single input which promises a greater return in net profit per acre.

Dr. F. W. Quackenbush of Lafayette, Indiana, was moderator of the afternoon panel session on Secondary, Minor and Trace Elements. Each of the four panel participants presented papers. Dr. Frank G. Viets, Jr., Soil Scientist, USDA, Fort Collins, Colorado, was unable to attend due to the death of his father so his paper, "Agronomic Needs for Secondary and Microelements", was read by Carl Carlson, USDA, Beltsville.

According to Dr. Viets, each of the micro and secondary elements poses its own problems because of differences in chemical properties which affect its behavior in soils and functions in plants. Money spent on all microelement research in the soil plant field is probably less than that spent on just N or P. So we have a long way yet to go in getting even a fair understanding of these all-important catalyses of life.

What to use as sources of microelements and what happens to availability when they are mixed with other chemicals in fertilizers is a problem beset with the fact that chemists talk more than plants do. We simply have not asked the plants enough questions yet so that their answers can be interpreted in chemical language. Agronomic knowledge has not yet reached the point where chemical tests for availability should be imposed on the fertilizer industry.

Robert E. Lucas, Soil Science Department, Michigan State University, talked on Diagnosis and Recommendation of Secondary and Minor Elements. Said Mr. Lucas: "Because of glacial action, the soils of Michigan are extremely variable in parent material texture, and drainage. Under such conditions, plant nutrition problems are more complex. Secondary and minor element deficiencies in crops, though not widespread, do appear in many areas. Workers in soil fertility are often called upon to diagnose the problems in crops and make recommendations for control of the disorder. The secondary elements that concern us are calcium, magnesium, sodium, and sulphur. The minor elements are iron, manganese, boron, zinc, copper and molybdenum."

Mr. Lucas continued his talk with an outline of the steps to be con-

sidered in determining plant nutrient problems; also the effect of secondary and micronutrients deficiencies in crops and their recommendation for each.

Mr. Lucas concluded his talk with a description of regulations in force in Michigan which permit the addition of minor or secondary elements to any grade which has been licensed. The amount permitted is limited to an option of one of three selections for each plant nutrient. The limitation helps prevent endless numbers of combinations. He detailed the information Michigan requires on labels or tags when minor or secondary elements are added to a licensed fertilizer. The system has been used in Michigan for six years — the growers understand it, the fertilizer manufacturers like it because it is easy to handle requests for special fertilizer mixtures and they do not need to have a license for every odd formulation. Extension workers and others have also found the procedure to work satisfactorily.

"Our chief criticism of the proposed regulations for adoption under state fertilizer laws," said Mr. Lucas, "is the low minimum values permitted. We find that our minimum values are at least tenfold greater. For example, if manganese is needed, we recommend 5 to 40 pounds per acre depending upon soil condition, fertilizer placement and the crop grown. To obtain our minimum rate of 5 pounds would require 10,000 pounds of fertilizer as suggested by the proposed regulation. We feel strongly that the proposal will open the door for many claims which will obviously not correct a plant nutrient problem."

Gordon Cunningham, Tennessee Corporation, Atlanta, Georgia, spoke briefly on the sale and distribution of secondary and micronutrients.

S. F. Thornton, F. S. Royster Guano Company, Norfolk, Virginia, discussed Secondary and Micro Nutrients as Related to Mixed Fertilizer Production. The time is past, he said, when N-P-K alone can do the job expected of fertilizers under modern farming conditions. And there is strong evidence to indicate that we do have with us serious secondary and micro nutrient problems, that we now have many more deficiencies than we have had in the past. Progress has been made but as yet no generally acceptable method for handling the micro nutrient problem has been developed by fertilizer producers.

Two approaches are most commonly followed with mixed fertilizer

— (a) adding relatively large amounts of micro nutrients to take care of established needs, and (b) adding relatively small amounts of micro nutrient mixtures to fertilizers intended for general use. When he adds micro nutrients to his fertilizer, the producer recognizes full well these are not a cure-all for our unsolved nutritional problems. But he has demonstrated to his satisfaction that the micro nutrients do have a place in his fertilizer program. And his farmer customers seem to agree.

Current interest is centered around the labeling problem, said Mr. Thornton. Most state fertilizer laws now in force either ignore this problem or fail to set up definite micro nutrient procedures and standards. Under such conditions it is to be expected that requirements will vary widely from state to state and that considerable confusion will exist. An important step toward reduction of this confusion was, in his opinion, made in Chicago on August 25, 1961, at a meeting called by the Committee on Fertilizer Guarantees and Tolerances of the Association of American Fertilizer Control Officials and attended by selected representatives of A.A.F.C.O., the Soil Science Society of America and the American Society of Agronomy, and the fertilizer industry. At this meeting a statement of policy was drafted and unanimously approved in the form of a regulation proposed for adoption under state fertilizer laws and for inclusion as a regulation under the model fertilizer law.

"This proposed regulation expresses the thoughts of a rather large group of well informed individuals representing the various interests and regions involved," said Mr. Thornton, "it is my strong conviction that it deserves the sincere and enthusiastic support of all of us."

Winding up the program was a report on new legislation given by Elmer Christensen, Utah Department of Agriculture, Salt Lake City, Utah.

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'Proof of the pudding'—

# Allied Pictures Dealers and Farmers Who Cashed-in on 'Sell Enuf' Program

At a premiere showing of a new slide film series to liquid fertilizer manufacturers and distributors, Allied Chemical Corporation's Nitrogen Division demonstrated the results of a year's profits to dealers and farmers who participated in their *Sell Enuf* campaign launched a year ago.

Near-continuous showings of the film sequence were featured in a special suite at the annual convention of National Fertilizer Solutions Association in Chicago October 30-November 1. At the same convention a year earlier, Allied had taken the wraps off its *Sell Enuf* promotion campaign.

This year's presentation was built around a circle tour of the east-of-the-Rockies U.S., visiting every section and highlighting dealers and farmers who had profited by joining in the plan to maximize yields and profits by applying 'enuf' Arcadian Golden Uran, Nitrana and Feran.

Narrated by Nitrogen Division Agronomist Howard Lathrope, the pictorial journey launched itself from Chicago, the convention site, into the Indiana-Michigan-Ohio area. Color slides showed demonstration plots of corn where adequate applications of Uran had made a hundred dollar bushel difference in yields compared with the 'starvation alley' check plots immediately alongside, which yielded only 41 bushels an acre.

In the 'thumb' of Michigan, benefits of Nitrana side dressings on sugar beets were pictured in acres yielding 30 to 33 tons. Also pointed out were the leisure-hour activities of farmers who had saved enough time and made enough extra profit to excel at hobbies.

Other slides illustrated preplant and side-dressing applications of fertilizer to corn, as well as top dressing of wheat.

High yields of cabbage and tomatoes were the subjects of more color slides from Ohio.

Turning to the Northeast, the tour passed through the hills of Pennsylvania, stopping to cite a dealer who had doubled his volume this year by joining the *Sell Enuf* program.

Pastures and apple orchards were among his illustrations of where 'enuf' nitrogen had paid growers a handsome profit — and put additional money in the dealer's pocket at the same time.

New England scenes included rich tobacco fields and heavy-yielding potato farms.

Swinging into the Southeast, the camera picked up scenes of dairy farms where the dealer had sold the farmer on a plan of increasing profits by applying 'enuf'. Coastal bermuda pastures consuming 400 to 600 and more pounds of actual nitrogen per acre profitably were pictured, followed by peach orchards and citrus groves where yields have been boosted by the *Sell Enuf* scheme.

The tour then followed a Uran barge up the Mississippi to the rich rice country where Uran was being applied to huge tonnages of rice straw to speed decomposition of these residues. Included were views of aerial application of 120 pounds of nitrogen to rice crops, bringing an extra \$25.00 net profit per acre.

Cotton growers who used 'enuf' were shown in the new cars which extra profits had provided in just one year.

Next, the camera swung to the high plains of Texas, where a farmer was harvesting 6000 pounds of milo an acre from an application of 145 pounds of actual nitrogen per acre from Uran.

Turning into the rolling wheat fields of Kansas, pictures showed a farmer, owner of four sections of land, who used 'enuf' Uran to produce 50 bushels an acre — and who had just bought controlling interest in a modern bank.

His dealer, pushing a full-season program, was pictured applying Uran to snow-covered fields in win-



## ←Key to Pictures

**Top:** Special mural covered entire wall in Allied suite at Solutions convention.

**Center:** Allied's John Thiemann (right) briefs presentation to W. A. 'Red' Senesac (left) of Senesac Soil Service, Fowler, Ind., and Bill Arnold of Allied.

**Bottom:** Other spectators hearing John Thiemann's outline are (left to right) John L. Strauss, Ris-Van Div., Armour Agricultural Chemical Co., Belmond, Iowa; Lew Taylor, Michigan Bean Co., Saginaw; and W. Harold Schelm, executive secretary of National Fertilizer Solutions Assn., Peoria, Ill.



ter, and promoting its use in irrigation water.

From there the tour went into Nebraska, where a farmer had been able to keep his son on the farm by making 'a bigger farm without buying more acres' through plow-down of 150 pounds of nitrogen per acre to produce phenomenal corn yields.

Their dealer was shown illustrating the compatibility of Uran with zinc, copper, iron, herbicides and pesticides.

In Minnesota, the slides showed how a dealer has effectively tied in with Arcadian national advertising, and showed a client whose use of 'enuf' had helped him to build a new home.

An Iowa scene depicted an alert dealer briefing his salesmen on latest developments in scheduling his corn clinics and maintaining top-flight public relations. A believer in preplant application of nitrogen, in the fall whenever possible, he uses 'enuf' on his own farm. Slides illustrated a pair of his customers who use 150 pounds of actual nitrogen on all of their 550 acres in continuous corn and harvest 130 bushels an acre.

Turning back into Illinois, the film covered the activities of an alert dealer who check-counted the corn population on many farms last spring. Blaming himself as much as he would the farmer, if he failed to sell 'enuf', this dealer blanketed his county with well-marked demonstration plots. He works closely with his clients, helping them know their profits and costs of production, as well as checking out yield determinations. A final scene showed him checking over the books with a farmer whose use of 'enuf' had made enough profit from his rented farm operations to help purchase a farm of his own.

Most of the Allied dealers pictured in the presentation were liquid fertilizer manufacturers who distribute substantial quantities of direct-application Arcadian liquid nitrogen materials as a part of their complete plant nutrition package.

In a wrap-up, the slides pointed out that both the dealer and the farmer prosper when the dealer works closely enough with his customer to sell a program that insures application of sufficient nutrients to produce a profitable, low-unit-cost yield.

#### SCENES FROM 'SELL ENUF' TOUR

1. Giant map showed two wide-boom applicator tractors spraying entire nation with Arcadian Golden Uran.
2. New automobile dramatically illustrated what can be achieved with extra profits accruing to farmers and dealers who participated in the 'Sell Enuf' program.
3. On-the-farm demonstration plots capitalized with appropriate signs on the tremendous difference in yields from the full-treated plots, as with this side-by-side comparison in Indiana.
4. Here is an all-season built-in billboard spelling out 'Uran' in lush green on a hillside.
5. This typical dealer installation pictures transports loading out alongside the storage tanks at Farmers Soybean Corp., Blythedale, Ark.
6. This is the final in a progressive series of maps that spotlighted the tour of 'Sell Enuf' dealer activities through the eastern and central sections of the country.
7. Ollie Myers (left), of Myers, Inc., Lexington, Ill., who operates a dry blending plant and sells solutions, is pictured checking records with a farmer customer.
8. Repeating the theme of the 'Sell Enuf' program, this slide pictures a man trying to cover a barn with a hand-sized can of paint.



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## Interore Hosts to Second International Trade Seminar

Inspired by its first successful International Trade Seminar held three years ago, International Ore and Fertilizer Corp., 500 Fifth Ave., New York 36, N.Y., plays host to a second such event at New York's Savoy-Hilton Hotel December 6-8.

The Seminar will concern itself with world supply and demand of fertilizer and fertilizer raw materials. The program will be an expanded one compared with the first seminar because Interore has now increased the number of its offices abroad to 25. In addition to Interore U. S. and foreign personnel, the sessions will be attended by fertilizer processors from around the globe, as well as by numerous representatives of U.S. fertilizer producers. The first session will assess conditions in the Far East and Pacific; Southeast Asia and Pakistan; India; Africa; Europe; South America; and the Caribbean; Central America and Mexico. Against this geographical breakdown, the second session will deal with types of fertilizer: potash, nitrogen, soluble  $P_2O_5$  and complex fertilizers; and sulphur. Phosphate rock will be the subject of the fourth session. Others will be devoted to various aspects of the specialized techniques of selling, such as barbers, agronomics, the freight market, projects and new processes.

Of particular interest to foreign fertilizer processors will be an outline of the services available through Interore's newly formed affiliate, International Fertilizer Development Corporation, conducted by the vice-president in charge of its operations,

Christopher J. Pratt. This part of the program will explain how the corporation can advise processors on the construction or modernization of their plants from a technical or engineering standpoint and how to secure proper engineering services. It will further assist in getting loans, provide information on new processes and techniques and arrange cross-licensing, describe recent developments in materials handling, storage and distribution.

Speeches at the sessions will be limited to 15 or 20 minutes, each to be followed by a 10 to 15 minute discussion period. Attendance at the seminar is by invitation only. Attendance is expected to exceed 150.

## Obituaries

**F. Cecil Baker**, 72, president of American Potash and Chemical Co. from 1941 until his retirement in 1945, died November 5 at his home in South Shaftsbury, Vermont.

**John Sheldon Ferguson**, 60, of Davison Chemical division, W. R. Grace & Co., a fertilizer salesman for 27 years, died Nov. 11 at his home in Louisville, Ky.

**Giuseppe Mazzini**, 78, who directed the Montecatini chemical combine from 1935 to 1943, died Nov. 11 at Turin, Italy.

**Frederick D. Witmer, Jr.**, 52, general manager of the Ohio Lime Co., and a member of its board of directors, died Oct. 16 in Flower Hospital, Toledo.

### V-C USES 12 'PAYLOADERS' AT WILMINGTON

Twelve Hough 'PAYLOADER' tractor-shovels are in use at the Wilmington, N.C., fertilizer plant of the Virginia-Carolina Chemical Corp. One of them, a Model H-25 (2500-lb. operating capacity), is shown here unloading incoming material from a boxcar. A wet-mix operation, the Wilmington plant has a capacity rating of 100,000 tons of fertilizer annually, and serves a tobacco, truck and general farming area within a 150-mile radius of the city.



## USDA Releases Handbook on Direct-Application N

Just off the press is a new USDA handbook titled *Liquid Nitrogen Fertilizers for Direct Application*. This brings together information on consumption, characteristics, manufacturing processes and facilities, handling and storage, application methods and equipment, crop response and economic considerations.

To order, send 30c per copy to Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. and ask for handbook by title and as Agriculture Handbook No. 198.

## FAO Issues New 1961 World Report

A publication covering 175 pages has just been issued by the United Nations Food and Agriculture Organization. It reviews the state of food and agriculture for 1961 and continues the data which has been provided in this form since 1956.

The data covers the situation which has prevailed for so many years — abundance and surplus in the world's developed half, with malnutrition and hunger in many of

the less developed countries. It shows the steps being taken to change this picture, the statistics on world movement of fertilizer materials, and other information which has come to us in this form since

1956.

The price is \$2 and the book may be secured in the U.S. from Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N.Y.

## Valuable Publication Offered

Official Publication #15 published by the Association of American Fertilizer Control Officials will be ready for distribution at \$2.00 per copy by December 10, 1961. The publication carries: official definitions for all fertilizer terms; names, addresses and telephone numbers of all fertilizer control officials; a copy of the last draft of the Model Fertilizer Bill; reports of all investigators; and the complete addresses given by prominent authorities at the annual meeting held in Washington on October 26, 1961. Below is a list of the speakers and their subjects:

**Presidential Address**—C. V. Marshall, Ottawa, Canada

**The Land Grant Colleges and American Agriculture**—Dr. R. C. Edwards, president, Clemson College, Clemson, S.C.

**Fertilizers and Our Changing Agriculture**—Dr. W. H. Garman, National Plant Food Institute, Washington, D.C.

**Panel: Secondary, Minor and Trace Elements as related to:**

(Dr. F. W. Quackenbush, Purdue University, Lafayette, Ind., moderator)

1. Agronomic Needs—Dr. Frank G. Viets, Jr., soil scientist, USDA, Fort Collins, Colo.
2. Diagnosis and Recommendations—Dr. Robert E. Lucas, extension specialist in Soil Science, Michigan State University, East Lansing.
3. Sale and Distribution—Gordon Cunningham, Tennessee Corporation, Atlanta, Ga.
4. Mixed Fertilizer Production—Dr. S. F. Thornton, F. S. Royster Guano Co., Norfolk, Va.

**New Legislation**—M. E. Christensen, Department of Agriculture, Salt Lake City, Utah

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## Potash Deliveries Increase For Quarter, Nine Months

Deliveries of potash for agricultural purposes in the United States, Canada, Cuba, and Puerto Rico by the eight principal American producers, and also the importers, totaled 2,936,666 tons of salts containing an equivalent of 1,712,364 tons  $K_2O$  during the first nine months of 1961, according to the American Potash Institute. Excluding imports for the 3rd quarter of 1961, this was an increase of less than 1% in salts and  $K_2O$  over the same period in 1960. Continental United States took 1,599,073 tons  $K_2O$ , Canada 76,988

tons, Cuba none, Puerto Rico 21,893 tons, and Hawaii 14,410 tons  $K_2O$ . These figures include imports of 210,900 tons  $K_2O$  for the first nine months of the year. Exports to other countries were 271,553 tons  $K_2O$ . Deliveries of potash for non-agricultural purposes amounted to 113,814 tons  $K_2O$ , a decrease of 2% under last year. Total deliveries for all purposes were 3,576,650 tons of salts containing an equivalent of 2,097,731 tons  $K_2O$ , a decrease of 1% in salts and  $K_2O$ .

During the third quarter of 1961, deliveries, including imports, for agricultural purposes were 455,350 tons  $K_2O$  in Continental United States, 32,910 tons in Canada, none

in Cuba, 7,092 tons in Puerto Rico, and 5,703 tons in Hawaii, making a total of 501,055 tons  $K_2O$ . Excluding imports, this was an increase of 95% over last year. Imports for the third quarter amounted to 57,300 tons  $K_2O$ . Exports of potash to other countries during the third quarter were 91,145 tons  $K_2O$ , a decrease of 24% under last year. Deliveries of potash for non-agricultural purposes were 39,485 tons  $K_2O$ , an increase of over 16% over last year. Total deliveries in the third quarter were 1,069,836 tons of salts containing an equivalent of 631,685 tons  $K_2O$ . Excluding imports, this was an increase of about 50% in salts and  $K_2O$  over the third quarter in 1960.

## CF Staff-Tabulated TONNAGE REPORTS

FERTILIZER TONNAGE REPORT (in equivalent short tons) Compiled by Cooperating State Control Officials and Tabulated by COMMERCIAL FERTILIZER STAFF

STATE	October		September		July-Sept. Qtr.		January-June		July-December		YEAR (July-June)	
	1961	1960	1961	1960	1961	1960	1961	1960	1960	1959	1960-61	1959-60
Alabama	-----	51,405*	49,228	39,323	97,636	79,756	812,241	869,240	181,587	180,959	993,828	1,050,199
Arkansas	-----	10,401*	16,090	13,380	50,141	42,802	312,038	303,835	61,633	58,713	373,671	362,548
Georgia	54,238	43,181	14,142	22,969	151,091	131,927	1,202,510	1,102,220	313,241	299,194	1,515,751	1,401,414
Kentucky	-----	30,983*	-----	22,752*	-----	47,781*	459,375	461,786	102,192	108,734	561,567	570,520
Louisiana	17,219	21,568	14,758	12,999	33,215	33,884	220,340	224,087	73,814	66,744	294,154	290,831
Mississippi	40,415	34,718	45,594	43,921	85,085	80,325	550,528	545,423	145,632	144,374	671,918	689,797
Missouri	-----	98,306*	-----	83,871*	149,210	151,075	547,116	524,336	334,657	277,708	881,783	802,044
N. Carolina	-----	55,448*	33,662	40,007	68,875	71,020	1,371,080	1,381,263	202,694	175,533	1,573,774	1,556,796
Oklahoma	-----	24,273*	46,825	38,198	77,625	61,396	87,844	72,246	94,690	72,511	182,534	144,757
S. Carolina	18,195	27,650	19,413	21,039	50,527	46,103	693,165	678,986	110,096	104,903	803,261	783,889
Tennessee	28,298	26,203	37,690	38,701	86,216	83,583	467,997	482,980	124,747	117,275	592,744	607,727
Texas	-----	54,153*	-----	57,509*	-----	124,709*	531,678	474,626	234,376	233,410	766,056	708,037
California	-----	(reports compiled quarterly)	-----	-----	217,834	219,501	835,001	813,116	462,347	465,495	1,297,348	1,278,611
Virginia	-----	(reports compiled quarterly)	-----	-----	72,630	74,350	569,001	591,113	168,479	141,177	737,480	732,290
Indiana	-----	-----	(reports compiled semi-annually)	-----	-----	-----	797,711	828,164	317,372	321,956	1,115,083	1,150,120
Washington	-----	-----	(reports compiled semi-annually)	-----	-----	-----	155,538	183,510	100,473	88,464	256,011	276,486
<b>TOTAL</b>	<b>153,365</b>	<b>153,320</b>	<b>277,402</b>	<b>270,537</b>	<b>1,140,125</b>	<b>1,075,722</b>	<b>9,613,163</b>	<b>9,536,931</b>	<b>3,028,030</b>	<b>2,857,150</b>	<b>12,616,963</b>	<b>12,406,056</b>

----- (not yet reported)

\* Omitted from column total to allow comparison with same period of current year.

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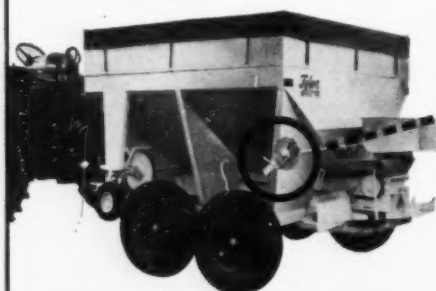
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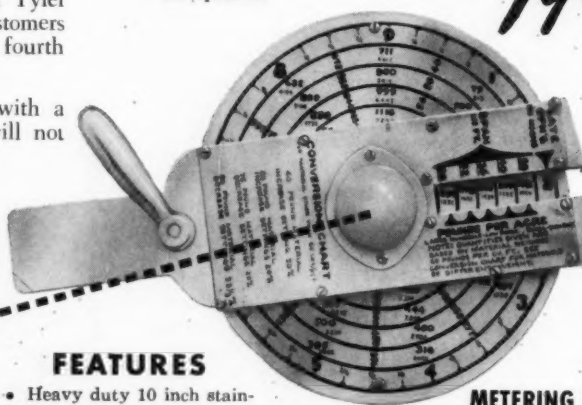
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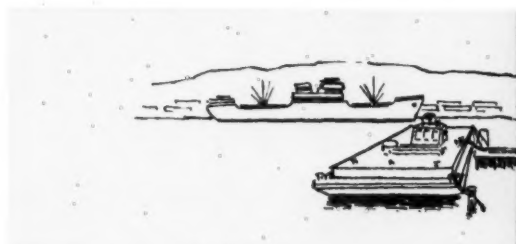
● TAMPA  
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- Nearing Completion
- Operating Terminals

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